POPULAR Computing WEEKLY

35p 23-29 February 1984

MAGAZINE OF THE YEAR CTA AWARD

BRITAIN'S BEST-SELLING MICRO WEEKLY

News Desk

QL delays grow day by day

SINCLAIR QL computer delivery schedules seem to be lengthening miraculously every week.

First customers for Sinclair's new computer have now all been sent a letter advising them that the company hopes to fulfill orders before the end of April. With the 28-day mail-order delivery deadline already up for some orders, this could mean a wait of a further nine weeks. Says managing director Nigel Searle: "We realise that the time between now and then will be frustrating (for customers) but we are confident that the QL will be worth waiting for and, of course, we will do everything possible to beat our target date for dispatch."

Sinclair is blaming "phenomenal demand" for the delay. However, it is hard to see how even the most staggering response could have affected the very first orders placed.

Some of the 400 customers who had ordered their QL machines by the end of the first day it was announced (January 12) have received letters indicating delivery by the end of April. But Sinclair still firmly denies any production problem with the QL.

Meanwhile, cheques from customers are now being cashed and payed into a special "Readers Trust Account". It remains to be seen what Sinclair will do with the interest accruing from their customers' money, while hopeful owners continue to wait.

● *Popular Computing Weekly's* own QL order was placed on January 12 and was effected on January 20. Six days have passed since the 28-day mail-order deadline has passed and our cheque has been cashed.

Egg on the face for Flan

ELAN Computers has hit big trouble only six weeks before the first of its under-£200 Enterprise computers is due to go on sale.

Following legal action taken by other electronics manufacturers, the company has been forced to change its name and may yet have to change the name of its computer.

From now on, the company will be calling itself Flan — rather than Elan — Computers.

Marketing manager Mike Shirly said: "The name Elan has been registered by another company here and overseas — people often register names without any intention of taking

continued on page 5



The new Flan Enterprise

This Week

CLASSIFIEDS START HERE

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Free readers entries to buy or sell a computer. Ring 01-437 4343 and give us the details.

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STAR GAME
Hot Drop on BBC
See page 10

ULTIMATE



THE NOT·SO·SOFTWARE

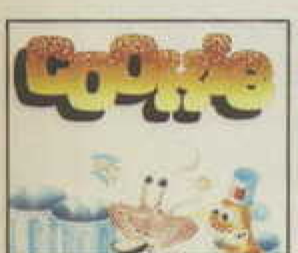
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Cookie 16/48K ZX Spectrum



Tranz Am 16/48K ZX Spectrum



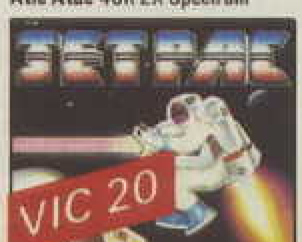
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How to submit articles
Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your own program returned you must include a stamped, addressed envelope.

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

Editorial

The Ministry of Defence's decision to ban a software protection device (*PCW*, 16-22 February) is perverse in the extreme.

It is difficult to see how JLC Data's anti-copying system could be considered 'prejudicial to the defence of the realm'. Illicit copies of *The Hobbit* and *Flight Simulation* are hardly likely to affect our national defence interests.

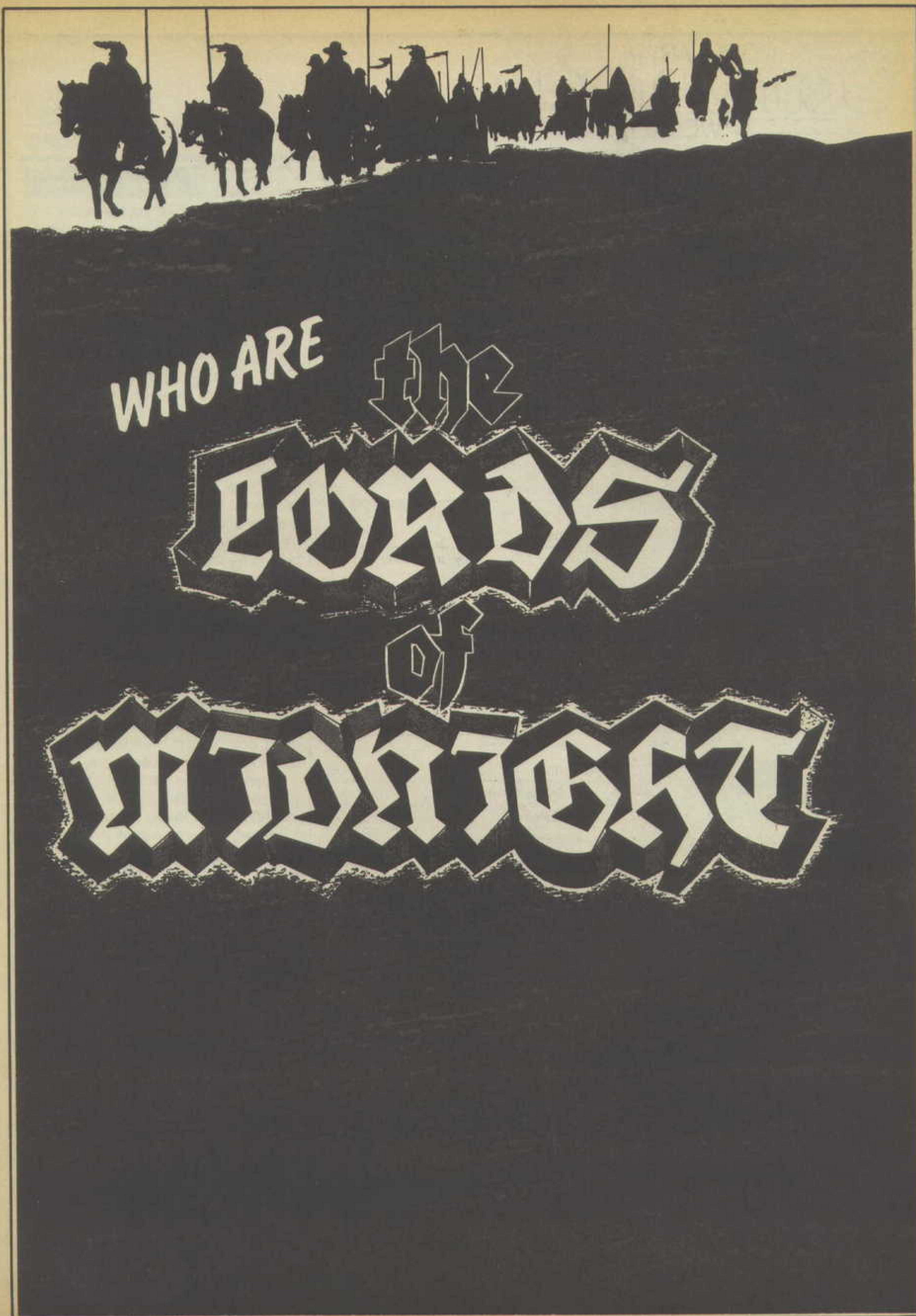
The MOD's Secrecy Order, placed under Section 22(1) of the 1977 Patents Act, appears to be concerned with the fact that JLC's device could prevent anyone, including the MoD, from breaking into on-line data transmissions. It is easier to see how the privacy of data communications could be considered vital to Britain's defences — indeed, it is rumoured that the government has already developed a similar device for its own use. However, this is a side-effect of JLC's system, it is not its main purpose.

The main effect of the MoD ban has been to publicise the anti-copying device, with all its attendant implications. Surely the MoD would have been better advised either to have kept quiet, or to have persuaded JLC to start working for the government.

It can only be a matter of time before someone comes up with a similar invention, be it in the UK or overseas. Knowledge is not an easy thing to ban.

Next Thursday

Eat as many fish as you can before you die of starvation, but avoid the deadly octopuses who will crush you. Sea Attack — next week's star game for BBC B by Mark Gidley.


WHO ARE the LORDS of MIDNIGHT

Undaunted by MoD

JLC DATA, the cassette duplication company which has had its anti-piracy invention banned by the Ministry of Defence (see *Popular Computing Weekly*, February 16), remains undaunted.

An earlier development of the same recording technique, which is unaffected by the MoD's secrecy order, has now been recommended by the Guild of Software Houses (GOSH) for use by its members.

In this simpler version of the protection device, the 'imprint' signal used to protect the software canbe heard as an audible tone on the tape, unlike the technique which is the subject of the MoD ban.

JLC's Jim Lamont sees little hope of regaining control of more recent work: "I fear we have lost it for good." Under the terms of the prohibition order issued under Section 221(1) of the 1977 Patents Act by the Patent Office such a ban can be applied to any development which could be "prejudicial to the defence of the realm".

It could take as long as mid-1985 before the MoD's Inventions Unit even begins to consider the JLC case.

It is difficult to discover the reason for the government action. A similar case in the US, where the National Security Agency stifled the effectiveness of an electronic fund transfer data protection device, was apparently the result of the NSA not wishing to have a system developed which it could not itself crack.

Mr Cole at the MoD's Inventions Unit at Fleetbank House, Salisbury Square in London declined to comment. Mr Kennard at the Patent Office suggested another number for press information: "I'm sorry to have to ask you to ring someone else, but these are my instructions at the moment—it will be better in the long run."

And so to Betty Powell: "I'm afraid I can't discuss individual cases. When the MoD receive details of the invention they will assess it and either revoke the order or keep the invention secret. There is no way round the procedure. I agree that under the powers of the Act an inventor could feel unhappy, but you can see that it is necessary for the MoD to be able to do this."



Jim Lamont of JLC Data, whose anti-copying device has been banned by the MoD An earlier version of the system is now being recommended by the Guild of Software Houses.

Flan

continued from page 1

them up.

"The change from Elan to Flan was the easiest for us to do — some people have been calling it the Flan computer anyway."

Name wranglers seem to have dogged Elan since the start. Even before the computer was officially announced last year it had suffered one name change — originally it was known as the Samurai micro, manufactured by Samurai Computers. A brief legal tussle with a company system under the name of Samurai encouraged the search for a new name and the Elan Enterprise was born.

● Flan is rumoured to be on the verge of announcing a multi-million pound manufacturing deal for producing the Enterprise in the UK.

Mail-order Lynx

FROM mid-March, Camputer's 48K Lynx will no longer be sold through high street shops.

Instead, the machine — to be renamed the Lynx Leisure — will be available only by mail-order direct from Camputers for £159.99 — a saving of £65 on its present price.

At £225 the machine had not been selling and the retreat to mail-order is a quick way to cut the price.

The Lynx 96K is fairing somewhat better at £299 and will continue to be sold in branches of Dixons, Laskeys and Spectrum Stores.

Camputers' delayed 128K Lynx Laureate is now scheduled for March, priced at £399.95 for the Basic machine and £995 for a system with CP/M, twin disc drives and a suite of business software packages.

New series from Beeb

THE BBC is to screen a new series of micro programmes — *Computers in Control* — beginning in March.

The five 25-minute episodes will look at control applications for computers, including robotics and automated assembly.

Each programme will be broadcast three times. Two of the showings will be at lunchtime beginning March 2. The third showing will be a weekly evening slot at 11.30pm, beginning on March 8.

PCW award

Popular Computing Weekly is proud to announce it has been awarded the title 'Magazine of the Year' by the Computer Trade Association.

Atari offers Logo package

VERSIONS of the Logo computer language are popping up all over the place.

Atari is now offering its Logo cartridge, which sells for £59.99, as part of a special schools package. The package, consisting of Logo plus an Atari 600XL computer, will be sold to schools for £201.

On the Spectrum, Kuma Computers has developed a Logo graphics utility which will sell for £9.95. Details from Kuma, 12 Horseshoe Park, Pangbourne, Berkshire.

Emulator for QL

A SPECTRUM emulator for the new Sinclair QL computer would be an interesting device.

Using it, any ZX Spectrum program could be run on the QL, instantly giving the machine a wealth of available software.

Sinclair itself has no plans to offer such a software emulator, so Joe the Lion, based in Cheshire, has stepped in. It has announced it is working on a combined Spectrum emulator and cassette interface for the QL enabling any Spectrum machine code cassette to be loaded and run.

Explained Lawrence Holt: "It will be some time before our *Emulator* program is in production — although we have a QL, we are hampered because changes may still be made to the machine's Rom." The complete package of emulator software on Microdrive cartridge and hardware interface to connect the cassette player should cost around £25.

Joe the Lion can be contacted at 213-215 Market Street, Hyde, Cheshire.

It is unlikely that many programs written specifically for the QL, commented: "If anybody even if a low-cost cassette interface is offered. Nigel Searle commented at the QL launch that a machine of the power of the QL was not well suited to a cassette-based system.

David Potter, managing director of Psion, the software house responsible for the four programs supplied with the QL, commented: "If anybody wants to put out cassette games they could easily produce a low-cost hardware interface, but they'd be crazy to do so. With Microdrive software I do not expect to lose more than 4 or 5 per cent through piracy and home taping.

"I do not think availability of the Microdrive cartridges will prove a problem either — Sinclair is gearing up production to the most extraordinary level and, next year, other companies will be making them too."

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Name..

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Letters

Blank reviews

It has come to my attention that while *PCW* and all the other computer magazines have been reviewing software cassettes, as yet there have been no reviews for blank cassettes.

I have experience of three makes of cassette: WH Smith C15, which has never lost a program; Boots C15, of which my cassette player makes a tasty meal thus rendering the cassette useless; and EMI C20, better value than the others per minute but dearer by 9p.

Perhaps other readers have preferences for or complaints against any particular brands of computer cassette?

Andrew Wiseman
68A Mayfield Road
Hartford
Huntingdon
Cambridgeshire PE18 7NJ

Conned by whom?

So your correspondents John Wheatly believes he has been conned by the microcomputer industry? More fool he!

If he had examined his own ideas a little more thoroughly before parting with his cash, he would have found no advertising claiming that micros can (a) feed 5000, (b) walk on water, (c) heal the sick or (d) make him more intelligent. All these, and more, are products of his own imagination.

Had the micro he bought possessed property (d), he would have realised that the home computer has more in common with the TV set through which it operates than with any sci-fi device aimed at saving the world.

I note with interest that he does not possess an electric train set. Perhaps this is indicative of the type of man we are dealing with.

I think Mr Wheatley is the type of man who feels that everything on life should have a purpose, but contrives to ignore some purposes completely. He should take part-time work to busy his idle hands, rather than meddle with micros, which are aimed at people's leisure hours. Obviously, he believes leisure to be simply wasting time and needs to be 'doing something useful' all the time. Programming is not enough for a man of this bent — for what does the program *do*? Has he gained from his micro one solitary slice of toast or pound note? No! Conclusive evidence exists that micro-computers are incapable of performing the simplest tasks such as making toast or printing money (without the right peripherals!)

I wonder how he would have coped born into an earlier age, faced with that dazzling innovation, the television? He would most likely have bought one, but bemoaned the fact that it had not improved his spots or dandruff.

On the subject of computer magazines, these are published to satisfy the needs of those who are interested in computers. Mr Wheatley evidently has no use for publications of this kind. In fact, reading is a rather pointless exercise for a man of action like JW. I bet he stays awake at night trying to think of ways to utilize all those hours wasted sleeping!

My computer has brought me many hours of amusement, which would otherwise have been wasted doing homework. I have learnt programming, made sense of 'O' level maths, and made a lot of new friends from this satisfying hobby.

As for owning a computer making anyone 'clever or wise' — most of us were wise enough to realise just what a computer could do before buying one!

Gill Hesketh
379 Liverpool Road
Eccles
Manchester
M30 7HB

Taking advantage

We think it a sad reflection on the character of some of your readers that they find it necessary to take advantage of those unfortunate enough not to have been included on Sinclair's 'magic list'. We refer to those who offer for sale Microdrive order forms, which they themselves obtained free of charge. We gave ours away.

Phil Stention
Chris Fife-Schaw
Dept. of Psychology
University of Sheffield

We could not agree with you more and would like to thank you and everyone else who brought this matter to our attention. *PCW* will no longer be accepting advertisements offering Microdrive order forms for sale.

Orange mistake

I noticed a mistake in my article *Orange* in *PCW* 26 January-1 February. The 3rd byte in line 38 should read Ø not 255. Luckily, this only prevented the colouring of the last three bytes in the attribute file.

Simon Cox
51 First Ave
Dunstable
Beds LU6 3AJ

In total agreement

As a devoted reader of your 'weekly micro mag' (yuk) there are some things in it which interest me more than others. I religiously read Tony Bridge (by the way, what has happened to the Helpline column), the games reviews, New Releases and This Week, also the letters page.

Not being a computer programmer (yet), I scan the rest of *PCW* for any relevant information. But, what a lovely surprise to find in Ziggurat, something I seldom even glance at, someone else with the same views as I have.



"From the Ministry of Defence about my invention. What is it — a contract or a secrecy order?"

Why is it that the computer industry is so patronising about women and computers? No survey has ever asked me, or anyone I know, how I feel, if I have a computer, what kind of games I play, etc.

I totally agree with Jane Stoneham (*PCW* 9-15 February) regarding adventure games — all the women I know with computers which range from the BBC B through the Spectrum to the Commodore are adventure mad. Personally, I have finished *Knight's Quest*, 75 percent of *the Hobbit, Pimania*, ¾ of *Black Crystal* and am on *Magic Mountain* at the moment. The Arcade games that interest me are *Ah Diddums, Atic Atac, Manic Miner* and *Penetrator*. If any survey company reads this, I think you are asking the wrong women.

Mrs M Roberts
15 Ruffa Lane
Pickering YO18 7HN

PS. I'd like to see more of Jane Stoneham in *PCW*.

Jane Stoneham's article certainly attracted a great deal of interest. Perhaps some of our other readers would like to write in with their views on the subject.

As for the Helpline column, apologies to everyone who has sent in entries. Normal service will be resumed shortly.

Puzzle solvers

I refer to David Senior's letter in *PCW* 12-18 January. I too tackle the puzzle every week and religiously send a postcard with the solution to *PCW* (I've never won).

Some puzzles I find are extremely easy to solve — having developed a set of programs to suit each case — others not so.

I timed myself solving puzzle No 86 and it took me five minutes thinking time, one minute programming time and 0.9 seconds program running time, which is a personal best (Spectrum).

T Vernon
11 Rustington Close
Upperwood
Lower Ealey
Reading
Berks



VALHALLA

Star Game

Hot Drop

A new game for BBC by Ken Swallow

Land the Commando helicopter in the dangerous valley, dodging the shots from the enemy fort . . .

The development of programs like this, as with various 'lander' and 'bombrun' programs, can be a useful learning exercise. Each of the early stages illustrates a simple element of programming:

a) defining a character that can be positioned at text '*Tabs*' or graphics co-ordinates
b) *Drawing* a 'landscape'
c) *Printing* a set of instructions
d) and then the main loop (from line 320 to line 550)

Putting in the shots was the most complex part. The *Shootback* is a flamboyant ending for the successful landing. It can be omitted or reduced. The main variables are:

X,Y	= craft's co-ordinates
F	= shot 'flag' (F=1 releases a shot)
P,p	= determine position and sub-position of the shot
C,D	= factors determining 'gradient' of shot
K$	= input from player

Once the player has found the 'safe' way(s) down, the appeal of the game may pall, but there's plenty of room for the programmer to develop it.

With a little ingenuity, a random element could be introduced into the shots — a squad of helicopters could be assembled — to be landed in turn — to demolish floors of the fort one at a time — a ranking table could be constructed for successive players . . .



```
>L.
 10 REM ****************************
 20 REM  'HOT DROP'   by Ken Swallow
 30 REM  and MD1/2y,People's College
 40 REM ****************************
 50 MODE 2
 60 REM ===============
 70 REM  THE 'CHOPPER'
 80 REM ===============
 90 VDU 23,200,255,24,24,60,60,126,90,90
100 VDU 23,210,90,126,60,24,60,102,66,195
110 REM ===============
120 REM    LANDSCAPE
130 REM ===============
140 COLOUR 132:CLS
150 FOR M = 1 TO 5
160 MOVE 440,20:DRAW 200+RND(100),M*40
170 IF M<3 THEN DRAW 0,M*90 ELSE DRAW
    130,250:DRAW 0,250
180 MOVE 840,20:DRAW 900+RND(200),M*40
190 DRAW 1280,M*90:NEXT M
200 VDU 24,440;5;840;25;:GCOL 0,130:CLG
210 COLOUR 4:COLOUR 134:PRINTTAB(0,19)
    ;"::"'"::"'"::"'"::"'"::"'"::"
220 REM ===============
230 REM  INTRODUCTION
240 REM ===============
250 VDU 28,2,20,17,3:COLOUR 132:CLS:
    COLOUR 1:PRINT'"     HOTDROP"
260 COLOUR 7:PRINT'"Land the chopper
    in the valley"'"Watch the shots
    from the fort"
270 COLOUR 3:PRINT'" The controls
    are:":COLOUR 1:PRINT'"    LEFT =
    'Z'"'"    RIGHT= 'X'"
280 COLOUR 2:PRINT'"  Press  space"'"
    bar to start":G=GET:COLOUR 132:
    CLS:VDU 26
290 REM ===============
300 REM  THE 'ACTION'
310 REM ===============
320 VDU 5:LET X =640:C=1.45:D=0.25:F=0
330 FOR Y =1000 TO 100 STEP -25
340 IF INT(Y/100)=Y/100 AND Y>100 THEN
    C=C-D:P=120:F=1
350 IF Y<600 THEN D=0.2
360 IF Y<100 THEN F=0
370 IF X<40 THEN X=40
380 IF X>1200 THEN X=1200
390 GCOL 0,3:MOVE X,Y:PRINT CHR$(200):
    MOVE X,Y-32:PRINT CHR$(210)
400 IF Y<(450-X) OR Y<(X-840)
    THEN PROCBANG
410 REM ===============
420 REM   THE SHOTS
430 REM ===============
440 IF F=0 THEN 520
450 FOR p=P TO P+240 STEP 30
460 IF 390+(p-120)*C>40 THEN GCOL 0,1:
    MOVE p,390+(p-120)*C:PRINT"*":SOUND
    0,-12,4,1:K=INKEY(4):GCOL 0,4:MOVE
    p,390+(p-120)*C:PRINT"*"
470 IF p>X-20 AND p<X+20 AND 380+(p-120)
    *C>Y-45 AND 380+(p-120)*C<Y+15
    THEN PROCBANG
480 NEXT:LET P=p
490 REM ===============
500 REM   MOVEMENT
510 REM ===============
520 K$=INKEY$(10)
530 GCOL 0,4:MOVE X,Y:PRINT CHR$200:
    MOVE X,Y-32:PRINT CHR$210
540 SOUND 1,-12,200-Y*4,2
550 IF K$ ="Z" THEN X =X-50
560 IF K$ ="X" THEN X =X+50
570 NEXT Y
580 *FX 15,1
590 REM ===============
600 REM  THE SHOOTBACK
610 REM ===============
620 GCOL 0,3:MOVE X,90:PRINT CHR$(200):
    MOVE X,58:PRINT CHR$(210)
630 FOR COL=8 TO 11:VDU 19,COL,
    6,0,0,0:NEXT
640 K=INKEY(70)
650 FOR S=1 TO 3
660 GCOL 0,5:MOVE X-20,70:DRAW 80,350:
    SOUND 0,-15,4,7:PROCdot
670 GCOL 0,4:MOVE 80,350:DRAW X-20,
    70:PROCdot
680 NEXT S:PROCdot
690 VDU 19,6,4,0,0,0
700 FOR COL=8 TO 11:VDU 19,COL,COL,
    0,0,0:NEXT
710 FOR COL=12 TO 15:VDU 19,COL,
    4,0,0,0:NEXT
720 FOR a=0 TO 2*PI STEP PI/12:GCOL 0,
    (11+RND(3)):R=70+RND(140):PROCflash
    (90,370):R=2*R:PROCflash(100,300):NEXT
730 FOR COL=13 TO 15:SOUND 0,-COL,6,
    14:VDU 19,COL,COL,0,0,0:NEXT
740 K=INKEY(400)
750 VDU 19,6,0,0,0,0
760 FOR COL=8 TO 15:VDU 19,COL,
    4,0,0,0:NEXT
770 K=INKEY(200):VDU4:VDU 28,2,8,17,5:
    COLOUR(128+RND(3)):CLS:COLOUR 0:PRINT'
    "Press space bar to restart":G=GET:RUN
780 END
790 REM ===============
800 REM   DISASTER !!
810 REM ===============
820 DEFPROCBANG
830 *FX 15,1
840 VDU 24,X-50;Y-50;X+50;Y+25;:GCOL 0,
    132:CLG:VDU 26
850 GCOL 0,3
860 MOVE X,Y+50:PRINT CHR$(200)
870 MOVE X,Y-70:PRINT CHR$(210)
880 FOR bit=1 TO 70
890 SOUND 0,-12,5,1:GCOL 0,RND(7)
900 PLOT 69,(X-15)+RND(100),(Y-100)
    +RND(200)
910 NEXT bit
920 K=INKEY(200):VDU4:VDU 28,2,8,17,5:
    COLOUR(128+RND(3)):CLS:COLOUR 0:PRINT'
    "Press space bar to restart":G=GET:RUN
930 ENDPROC
940 DEFPROCdot:FOR d=1 TO 50:GCOL 0,
    (7+RND(4)):PLOT 69,RND(128),
    250+RND(160):NEXT:ENDPROC
950 DEFPROCflash(A,B):MOVE A,B:DRAW
    A+R*COS(a),B+R*SIN(a):ENDPROC
```

Putting on the style

***David Kelly** talks to Psion's team of programmers working on the new Sinclair QL micro*

Everyone who buys a Sinclair QL will receive as well as the machine, four applications software packages written by Psion.

Writing the programs — *Easil* (a graphics package), *Quill* (a wordprocessor), *Abacus* (a spreadsheet) and *Archive* (a database) has been a major undertaking for a young company like Psion.

Sinclair approached Psion and several other companies — rumoured to include both Digital and Microsoft — at Christmas 1982 with a view to developing material for its new professional machine.

"Psion is an ambitious company and we aren't into producing specialist programs to keep legal records or patient dose rates. We wanted instead to be producing the fundamental software tools — the wordprocessors and spreadsheets — a market dominated by the big US software companies," explains managing director, David Potter.

"We had long discussions with Sinclair and the four QL programs are the first fruits of our joint agreement. They take the hardware to its limits and I think we surprised Sinclair with what we have achieved. The market doesn't know yet what we have done — as yet there have been no review machines available to the press.

"But the four packages are state-of-the-art products. Better, more powerful and conceptually more advanced than anything on any machine costing under £5000. *Archive* is probably the most powerful database program on any micro, full stop.

"It has been a huge effort for us. Frankly, this is why we haven't been coming out with too many home computer products recently."

Work on each of the QL programs was co-ordinated by a project leader. The four individuals were: Martin Brown (*Easil*), Martin Stamp (*Quill*), Colly Myers (*Abacus*) and Charles Davies (*Archive*). Each of the packages is designed at a fundamental level to be immediately accessible to a beginner. This is achieved by what Psion describes as 'their pyramidal structure'. Every parameter in the programs that can be selected by the user has a sensible default mode.

When any of the programs first appears on screen, it is ready for use in a form that is calculated to be the one most frequently desired. In all four, the function key F1 is a Help facility. *Help* is intelligent in that it will give you information related to what you were trying to do when your pressed *Help*.

"We spent about two months just thinking about how people draw graphs before starting on *Easil*" says Martin Brown. "The way most graph packages work is you type in lots of data and it asks you very many questions about what colour bars you want for your histogram and so on. With *Easil's* built-in defaults, all these are already answered for you. The first thing you do is key in the numbers and up comes the graph straight away, scaled for you."

The graph is then named. The command *Newdata* clears the screen for the next graph. A particular graph is presented using the *View* command, eg *View Costs.*

Built-in word count

Different sets of data are shown as different colour bars, or lines, or pie charts. You can enter formula. If you have two sets of data *Costs* and *Sales*, you can type in *Profit=Sales-Costs* and you will instantly get a third graph on screen labelled *Profits*. All the mathematical symbols can be coped with. Graphs can be annotated. The computer looks at what you type in and decides if it is a text label. If so, crosswires are presented on screen and moved with the cursor keys to position the text. In text mode there is a full line editor built-in.

Going deeper into the program different bar and line types can be selected from a pictorial menu. Deeper still, you can design your own bar. Moving the cursor and pressing the function key *F4* will delete bars. *Change* allows you to modify individual bars or lines. *Highlight* points up a particular value in a different colour. *Kill* kills whole graphs.

When a graph is finished, it can be *Exported* to the data base, spreadsheet or wordprocessor.

Quill, the wordprocessor, is just as easy to use. To start, hit any character on the keyboard and up comes the screen ready for you to begin typing. Says Martin Stamp "There are no control symbols on screen at all — what you see is what you get." So off you go typing away. Text is automatically continued on to the next line. Carriage return sets the new paragraph — indented for you. There is a built-in word, line and page count. *Insert* allows new text to be added at a point selected by using the cursor keys. Inserting one word, the text is automatically justified; more than one word breaks the text apart. Hit any key, apart from characters or delete, and it will heal the break, justifying the text appropriately.

At a deeper level in the program you can set margin width and page height. *F4* chooses type style — normal, bold, underlined, superscript or subscript.

Text can be displayed in 80, 64 or 40 characters per screen. *Justify* will produce text justified left, right, both or centred. You can insert headings and footnotes, page numbers are either arabic, roman or alphabetic. Page-breaks are displayed dynamically. *Goto XXX* will jump to the start of page XXX of the document. *Search* and *Replace* are obvious. *Merge* joins two documents. *Glossary* gives the facility to recall a string of key depressions. Pressing shift *F5* and a letter followed by text defines a glossary term. This can then be recalled in a document by pressing *F5* and the letter. Up to 26 Glossary terms can be defined in this way, each up to 50 characters in length. Commands such as margin settings can also be stored using *Glossary*.

The spreadsheet is a more specialist program giving basic accounting and yearly financial projections. Consequently, *Abacus* is slightly more difficult to come to grips with than the other two programs. Abacus calculates in whole rows. You give it a figure — say for January sales — and a single mathematical relation, and it will automatically produce sales figures for the whole year. Typing a single equation for the relation between sales and profits will instantly produce a whole new row of monthly profit forecasts. "All this can be achieved without typing a single command — I have tried to combine the style of *Supercalc* with the power of *Multiplan*" says Colly Myers.



Psion's team (from left to right): Charles Davies, Martin Brown, Colly Myers and Martin Stamp

At a deeper level there are 35 command words to help the budding accountant find the wood from the trees.

You can choose integer, decimal or exponent representation of the figures. Like the wordprocessor the display can be set to 80, 64 or 40 coloumns. *Amend* allows you to change any of the formulas you have used in the projections. A full line editor is incorporated. *Copy* allows you to copy any portion of your figures elsewhere in the grid.

You can delete row or columns. *Merge* allows different spreadsheets to be concatenated. *Window* allows the grid to be split up. *Lookup* allows you to develop a look-up table, say, of tax values. The maximum size grid is 64 x 256 cells. Spreadsheet tables can be saved or exported to *Easil*, *Archive* or *Quill*.

Finally, the most complex and powerful program of the suite is the database — *Archive*. Fundamentally the program has to

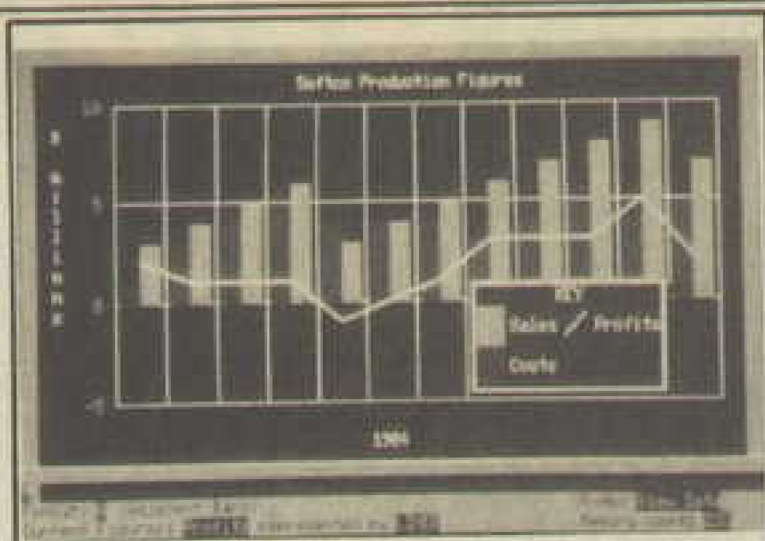
... specialist packages

cope with a wider range of applications than the others and *Archive* can be customised by the user; other software houses can easily adapt it to produce more specialist packages. *Archive* also comes with a selection of programs written with it including a simple cardfile program.

"We looked at other packages before starting on *Archive*. Usually they are a pig to work with — a third-degree setting up fields, fixing record lengths and dealing with many different data types," explains Charles Davies.

Psion's program gets round these drawbacks by offering a totally variable record length and only two types of data — strings and numbers.

You can get started with just a few commands. *Create* creates a file. Then you simply use the cursor keys to move around



the screen typing in the file labels, variable slots and variable lengths. It is as easy as using the cursor keys and typing.

When you have set up your file of records life begins to get interesting. *Archive* contains its own file searching language in which you can write programs and even define procedures. *Back, Next, First* and *Last* move you through the records. *Find XXX* searches for the string *XXX* in any file. Imagine a database of the countries of the world listing populations and other important data. Using Archive the instruction *Select continent$="Europe" And Pop> 20* will find countries in Europe and populations greater than 20m.

A more complex program (a procedure of eight lines) can easily rearrange the complete file of records in order of decending population. "The language is easier to use than Basic," says Charles. "There are about 90 key words but you only need a couple to get started."

More than one file can be open at once making *Archive* a true multi-file relational database. Its procedure editor has two windows — one shows the procedure menu, the other lists the procedure next to the cursor on the menu. *Tab* and *Shift Tab* move the cursor up and down the menu listing each of the procedures. F5 brings a selected line from the given procedure down for editing with the editor. *Cut* and *Paste* allow parts of one procedure to be taken and inserted into another. Tables can be shipped out from *Archive* to the Wordprocessor.

"The database gets its power from the fact that it is really a computer language — the *Archive* language."

Follow that! Well, Psion will. With more programs for the Spectrum and BBC and with more programs for the QL. Likely candidates on the QL are compiled languages — possibly Fortran — and games.

"It is the greatest games machine I have ever seen," says David Potter. "Games for the QL will have to be good though, just because of the quality of the machine. Compare its resolution of 512 x 256 with the 256 x 192 of the Spectrum. You have two-and-a-half times as much data to move around the screen. And unlike the BBC machine it has enough memory to run a decent game."




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Anyone for Denis?

***Tony Kendle** goes on the trail of the hidden booze in this round-up of Spectrum adventures*

There has been a dramatic increase lately in the amount of adventure game software available for the Spectrum. However, with the exception of glamorous programs like *Valhalla*, and one or two company names such as Level 9 or Digital Fantasia that always mean excellent quality, there is often little to guide a prospective buyer towards games that are value for money — hence the need for magazines like *Micro Adventurer*.

Writing adventures does not require any great programming feats, especially since the appearance of *The Quill* (the adventure writing utility sold by Gilsoft). Good ideas and good plots make good adventures and these are not the perogative of large established software houses. So, this week I would like to look at a recent collection of games from a range of companies including some less well known ones.

Among these adventures are two programs produced using *The Quill* and the first of these — *Magic Castle* — was specifically written for Gilsoft to market. Unfortunately, it looks the part of a set up job because, although competent, it lacks atmosphere or conviction and I found it less than gripping. By trying to illustrate the potential of *The Quill* as much as possible, it manages to show the program's limitations as well as its plus points.

For example, I was annoyed to find the message 'I am thirsty' flashing up on the screen just two moves after I had drunk from a fountain, thus forcing me back to drink again. It should not have been too difficult to set a flag so that this particular, not very taxing, problem did not appear if a drink had just been taken. Added to this are some spurious booby traps and puzzles that are neither difficult, exciting or relevent to the scenario. My opening moves, in a game set in a time of castles and princesses, found me lost within a minefield clutching an exploding football.

The package is topped off with a very rushed looking cassette inlay and the minimalist note 'Rescue the princess and avoid the booby traps and vampires' which is in stark contrast to the hefty tomes that accompany some adventures these days. On the bright side, things do improve and the problems do become more interesting, but it is still nothing that will revolutionise the adventure world. More thought, more consistency and a lot less of the arbitrary traps could have made it a much better game.

Denis Through The Drinking Glass is the game that Gilsoft should have chosen to promote *The Quill*. The originality and creativity of this adventure illustrates what a boon the adventure utility really is. I don't know anything about the author, but I venture to suggest that he is not a programming genius. And yet, thanks to Gilsoft, we are presented with a rapid-response, superbly complex game that is great fun to play. No longer must we rely on 12-year-old whizz kids or mathematicians — no offence — for our entertainment, because the more artistically minded can now enter the fray.



Denis is a wacky sideways look at the world of politics through the G and T sodden eyes of one *Denis Thatcher* — the concept appears to owe more than a little to the *Dear Bill* columns of *Private Eye*. Each location is described in rhyming couplets and you are faced with many, very difficult problems, the most pressing of which is to avoid Maggie and find where the booze is hidden.

If *Denis* doesn't get a drink within 10 moves the shock of reality proves sufficient to polish him off and, even when you do find some, it is a good idea to keep an eye on the number of turns you take because the danger of sobering up is always present.

I am sure the originality of the game is the root of its difficulty because the stock problems and stock solutions simply do not appear. For instance, what is the correct move when facing Keith Joseph or Ken Livingstone — none of your 'kill dragon' stuff works here — and, wonder of wonders, an adventure game where you don't have to carry a source of light.

The help clues are also original — most of them manage to be a single terse insult and yet also be a relevant clue. However, the best part of the game must be the replicas of the *Sun* newspaper that appear following any insignificant wrong move, complete with appropriate headline. For instance, step outside No 10 without dressing and you soon learn what it is like to be a page 3 girl. One helpful hint, the program does not understand the words *Search* or *Examine* — you have to *Look* object or room.

An excellent game and I look forward to the follow-up, '*Tebbit*' with anticipation.

Murder at the Manor from Gemtime initially struck me as less of a prize. It is one of those graphic adventures where box like rooms and buildings take ages to appear and yet add nothing to the atmosphere or enjoyment. I would much rather the memory had been better used to give more rooms, less terse text and a faster response time.

The arrangement of the various locations was one of the most difficult to follow that I have seen, with many of the directions all leading to the same place. This would have been less of a problem if it were not for the increasingly irritating wait for the pictures to redraw themselves. However, once you have adjusted to the peculiar map and the slow pace of the game there are some nice features.

You play the role of a detective trying to solve a murder mystery. The opening scenario is a small village where you wander the streets looking for useful objects, very necessary food parcels and the way out. This initial problem of finding your way to the manor itself is no joke and there is the added complication of maintaining your energy levels long enough to get there.

On your way around, you meet characters that you can ask for clues, fight or regard as suspects, although there are some that you would do well not to tangle with — such as a very vicious rat. There is,

therefore, a limited degree of interaction between the characters — and the adventure also measures the passage of time with some noticeable differences between night and day. Later stages of the game take you through the countryside to a graveyard and then to the manor itself. Here you find the victim, the Lord of the Manor, and also some suspects which traditionally include the gardener and the butler.

One advantage of the game is that a new murderer is chosen every time you play, so you can never quite predict what will happen. Personally, I think the rat did it.

The program is written in Basic, which makes it even slower, and I was unhappy to find that should you die you have to reload at least parts of the program before you can start again. However, despite this, the game is worth playing.

Mountains of Ket from Incentive Software is another game that offers 'interactive characters'. This is the first part of a trilogy of text adventures that involve the same central character. Here you have the relatively simple aim of reaching the other side of the Mountains of Ket, but in the later games you will have some magical despots to destroy.

At the beginning, you are awarded various points representing your fighting prowess, energy and luck and these largely determine your chances of winning any combat you enter into. All the characters you meet, including your trusty horse, can be fought and the result is that even when you can't solve a certain riddle, such as finding the password, you can fight your way through to new locations. However, this does make it hard to know when there are puzzles to solve and when fighting is supposed to be inevitable. The prowess of the opponents also varies from game to game and the outcome of a fight is truly unpredictable. One thing I am unhappy about is the gory description of the combat, but perhaps this is designed to stop you being over aggressive.



The opening scenes find you by a village with some not too difficult problems to solve before you obtain enough provisions and can proceed to the mountains. A word of advice — don't fight the villagers.

Answers to the many puzzles are not easy to find and everything is complicated by a rat that can appear at random times and carrry off any object that you drop.

The programming of this adventure is very professional, with a nicely designed layout and each object represented by a small graphic. Response is fast, as is the action of the combat sequences, and the game is well error trapped with most possible commands anticipated. There are, inevitably, certain objects within some rooms that the computer does not recognise, but generally this is a very polished adventure with some nice ideas.

Incentive Software is aptly named because it promises that it "could be to your advantage" to score 100 per cent but anyone who scores maximum points on all three games will deserve a prize.

Finally, I would like to go off on a slight tangent to look at *Atic Atac* from Ultimate. There are many games that claim the title of arcade — adventures, but the only ones that I have seen that deserve this accolade are *Halls of the Things* and *Atic Atac*. This is because they are both games that require thought and caution in order to succeed.

Of the two, *Atic Atac* sticks most closely to a true adventure format. You are given a quest to find the three parts of a key needed to escape the haunted house where you are trapped. On your way around the various locations, which you are strongly advised to map, you discover objects that help you enter different rooms or destroy certain monsters.

All the time you are under attack from a collection of ghouls, ghosts, pumpkins and the like. You can battle these in different ways, depending on which character you have decided to be from a choice of knight, wizard or serf. Each of these not only possesses different weapons but also has access to different ways of travelling between rooms. I don't intend to reveal the details here, but I will say that like all good adventures there is a logic to these secret passages and the use to which the objects you find can be put.

The game is presented in superbly animated arcade action with bold and colourful sprites of cartoon quality. The pictures of the different rooms are excellently drawn and page almost instantaneously as you charge from one to the next. The sense of humour that pervades the game is demonstrated by the fact that your current energy status is represented by the state of a huge roast chicken on the side of the screen — when the chicken is reduced to a heap of bones then you reach the end of your current life.

The only criticism I would make is the choice of the *QWERT* keys to control the character.

I know that hardened adventure fanatics are supposed to look down on arcarde games, but I would not be surprised if some were made to think again after seeing this program.

In summary, not only the quantity but also the style and content of adventure games available are reaching new heights and with the mass market of Spectrum owners available this trend should intensify over the coming months. I think we can look forward to some great things and it is not necessarily going to be established software houses that lead the field.

Firm	Program	Price	Value (1-10)
Gilsoft 30 Hawthorn Road Barry S Glamorgan	*Magic Castle*	£5.95	6
Applications Software Dept PCWK 8 St Pauls Road Peterborough PE1 3DW	*Denis through the Drinking Glass*	£5.50	9
Gemtime 16 Ben Ledi Road Kirkcaldy	*Murder at the Manor*	£6.95	7
Incentive Software 54 London Street Reading RG1 4SQ	*Mountains of Ket*	£5.50	8
Ultimate The Green Ashby-de-la-Zouch Leics	*Atic Atac*	£5.50	10



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Dial 7 for murder

***R W Tinman** clocks the digits on your BBC B*

This program runs on a BBC model B or upgraded model A. I used mode 2 graphics to draw two digits. Each digit has seven segments, like some digital clocks and watches. Each segment is drawn in a different colour. The colours can then be changed to form a number. This is done with the *VDU19* command. The digits can then be made to count up in seconds, 10th of seconds or 100th of seconds.

The variables are as follows:

COL%	Colour of digits.
BCOL%	Screen colour.
LCOL%	Border colour.
S	Scale of digits
TI	Time take for each count (in 100th of sec.)
X%	Number of counts.
D$(10)	Segment pattern for numbers 0 to 9.
Q	Vertical position of digits.
W	Horizontal position of digits.

The following lines should read:

```
530 FOR W%=1 TO 14: VDU 19,W%, BCOL%, 0, 0, 0:
NEXT
650 FOR W%=1 TO 7: VDU 19, W%, BCOL%, 0, 0, 0:
Next: N%= . . . . .etc . . . . .
```

```
10 REM*******************************
20 REM***   7  SEGMENT DISPLAY    ***
30 REM*******************************
40 REM***       by R.Tinman       ***
50 REM*******************************
60 REM
70 MODE2
80 VDU 23;8202;0;0;0;
90 COL%=1
100 BCOL%=0
110 LCOL%=3
120 S=2
130 TI=100
140 X%=0
150 VDU 19,0,BCOL%,0,0,0
160 DIM D$(10)
170 D$(1)="123567":D$(2)="36":D$(3)=
   "13457":D$(4)="13467":D$(5)="2346"
180 D$(6)="12467":D$(7)="124567":D$(8)
   ="136":D$(9)="1234567":D$(10)
   ="123467"
190 Q=0:W=100:VDU 29,Q;W;
200 PROCBORDER:PROCVDU
210 READ A,B,C,D,E,F,G,H,CO
220 CO=CO+7
230 PROCDRAW(Q,W,CO)
240 IF CO=14 GOTO 260
250 GOTO 210
260 Q=80*S*4:VDU 29,Q;W;
270 RESTORE 440
280 READ A,B,C,D,E,F,H,CO
290 PROCDRAW(Q,W,CO)
300 IF CO=7 PROCNUMBER
310 GOTO 280
320 REM
330 REM*******************************
340 REM***       PROCEDURES       ***
350 REM*******************************
360 REM
370 DEF PROCDRAW(X%,Y%,C%)
380 GCOLO,C%
390 MOVE A*S*4,B*S*4
400 DRAW C*S*4,D*S*4
410 PLOT 85,E*S*4,F*S*4
420 PLOT 85,G*S*4,H*S*4
430 ENDPROC
440 DATA 27,90,75,90,37,83,64,83,1
450 DATA 19,54,27,88,27,58,33,83,2
460 DATA 61,58,67,83,67,54,75,88,3
470 DATA 61,55,67,51,26,55,18,51,4
480 DATA 67,51,58,48,18,51,24,48,4
490 DATA 6,3,18,48,15,8,24,45,5
500 DATA 52,9,59,45,58,4,66,48,6
510 DATA 7,0,57,0,17,6,50,6,7
520 DEF PROCVDU
530 FOR W%=1 TO 14:VDU 19,W%,0,0,0,0
   :NEXT
540 ENDPROC
550 DEF PROCNUMBER
560 PROCCHANGE(X%)
570 SOUND 1,-15,200,4
580 PROCCHANGE(X%)
590 X%=X%+1
600 IF X%>59 X%=0:SOUND 1,-15,200,2
610 TIME=0:REPEAT UNTIL TIME>TI
620 GOTO 580
630 ENDPROC
640 DEF PROCCHANGE(O%)
650 FOR W%=1 TO 7:VDU 19,W%,0,0,0,0
   :NEXT:N%=VAL(RIGHT$(STR$(O%),1))
   :N2%=VAL(LEFT
$(STR$(O%),1))
660 FOR W%=1 TO LEN(D$(N%+1))
670 V$=MID$(D$(N%+1),W%,1)
680 V%=VAL(V$)
690 VDU 19,V%,COL%,0,0,0
700 NEXT
710 IF N%<>0 ENDPROC
720 FOR W%=1 TO LEN(D$(N2%+1))
740 V$=MID$(D$(N2%+1),W%,1)
750 V%=VAL(V$)
760 VDU 19,V%,COL%,0,0,0
770 NEXT
780 ENDPROC
790 DEF PROCBORDER
800 W=W/4
810 VDU19,15,LCOL%,0,0,0:GCOLO,15
820 MOVE S*4,S*4-W:DRAW S*4,90*S*4+W
830 DRAW 80*S*6+75*S*2,90*S*4+W
840 DRAW 80*S*6+75+S*2,S*4-W
850 DRAW S*4,S*4-W
860 MOVE 80*S*4,90*S*4+W
870 DRAW 80*S*4,S*4-W
880 W=W*4
890 COLOUR 15:PRINT TAB(1,2);"7
   SEGMENT DISPLAY"
900 ENDPROC
```

Basicode and the Spectrum

Ian Logan explains how to produce a Basicode listing

In last week's article I discussed how it is possible to use a Spectrum to examine the signals found on a cassette tape containing, for example, a BBC *Basicode* program. In this week's article, I give a Spectrum program that *Loads* a *Basicode* tape and produces a print-out of the program.

Before using the *Basicode Listing* program, it is necessary to obtain a fairly 'clean' *Basicode* recording — I can only suggest that you try recording from a VHF transmission onto an unsophisticated 'mono' cassette recorder. Last week's *Tape Examiner* program can be used to assess the quality of the recording. Traces as good as those featured last week are desirable and signify a sufficiently high standard of recording.

The accompanying *Basicode Listing* program contains a fairly complex machine code routine that reads a *Basicode* tape and stores the program it finds in 'free' Ram, from location 36864 onwards. There is provision for up to 12K of program to be *Loaded*.

The routine in lines 400–480, at present, leads to the *Basicode* program appearing on the tv screen, but this can be altered as required. For example, to save the program on Microdrive one might add:

```
405 OPEN #2, "m",1,"program 1"
450 IF B=3 THEN CLOSE #2: STOP
```

Or, to use a ZX Printer, change line 460 to read:

```
460 LPRINT CHR$ b;
```

Once a listing of a *Basicode* program has been obtained, it then has to be 'translated' into Sinclair Basic, which is not a straightforward task. There are several problems to consider: 1 There are several subroutines that are common to all *Basicode* programs and these are not transmitted with the programs, eg, the subroutine at line 210 is an *Input* routine that returns a value *In$*. A suitable Spectrum subroutine might be:

```
210 LET IN$=INKEY$: IF IN$="" THEN GOTO
    210
211 RETURN
```

2 *Basicode* programs normally require a screen of size 40 characters by 24 characters, which is not very easy to produce on the Spectrum using machine code, let alone in Basic. 3 *Basicode* uses typical Microsoft Basic string slicing, ie, it uses *Left$* and *Mid$*, and these can be very difficult to translate if the programmer has not given a lot of Rem statements.

Overall, translation is far from easy and I await with interest the Basicode Spectrum kit that is to become available shortly.

A note about the machine code routine — This routine in Z80 machine code language makes use of monitor subroutines that *'wait' for one (05e7h)* or two *(05e3h)* transitions in the signal arriving at the Spectrum's cassette port. The details of these routines are given in *The Complete Spectrum Rom Disassembly* by myself and Dr Frank O'Hara.

```
  10 REM  ** BASICODE LISTER **
  20
  30 REM  ** by Dr.Ian Logan **
  40
 100 REM load machine code
 110 RESTORE
 120 FOR a=32768 TO 32913
 130 READ n
 140 POKE a,n
 150 NEXT a
 160
 200 REM load program
 210 CLS
 220 PRINT AT 3,7;"BASICODE LISTER"
 230 PRINT AT 5,3;"written by
     Dr.Ian Logan"
 240 PRINT AT 10,0;"Position your
     BASICODE tape."
 250 PRINT AT 12,0;"Connect your
     lead for LOADING"
 260 PRINT AT 14,0;"in the normal
     manner."
 270 PRINT AT 16,0;"Press PLAY and
     any key."
 280 PAUSE 0
 290 CLS
 300 PRINT AT 6,11;"LOADING"
 320 RANDOMIZE USR 32768
 330
 400 REM display program
 410 CLS
 420 FOR a=36864 TO 49151
 430 LET b=PEEK a
 440 IF b=2 THEN GO TO 470
 450 IF b=3 THEN STOP
 460 PRINT CHR$ b;
 470 NEXT a
 480
1000 REM machine code data
1010 DATA 221,33,0,144,17,0,48
1020 DATA 243,62,15,211,254,219
1030 DATA 254,31,230,32,246,2
1040 DATA 79,191,32,120,6,0,205
1050 DATA 231,5,48,247,33,21,4
1060 DATA 16,254,43,124,181,32
1070 DATA 249,205,227,5,48,232,6
1080 DATA 176,205,227,5,48,225
1090 DATA 62,180,184,48,224,62
1100 DATA 208,184,56,219,36,32
1110 DATA 236,6,176,205,231,5,48
1120 DATA 205,62,190,184,48,244
1130 DATA 6,176,205,231,5,48,193
1140 DATA 121,230,252,203,87,32
1150 DATA 2,246,3,79,38,7,46,0
1160 DATA 6,176,205,227,5,62,198
1170 DATA 184,245,6,176,212,227
1180 DATA 5,241,63,203,29,37,32
1190 DATA 235,203,61,221,117,0
1200 DATA 221,35,62,3,189,40,12
1210 DATA 62,127,219,254,31,48,5
1220 DATA 122,179,27,32,178
1230 DATA 195,63,5
```

```
00010   ;tape reader for BASICODE
00020   ;written by  Dr. Ian Logan
00030
00040          org  8000h  ;32768 dec.
00050
00060   ;initialize
00070   start  ld    ix,9000h  ;dest
00080          ld    de,3000h  ;length
00090          di    ;interrupts off
00100          ld    a,0fh
00110          out   (0feh),a ;clear port
00120          in    a,(0feh) ;
00130          rra
00140          and   20h
00150          or    02h       ;red border
00160          ld    c,a
00170          cp    a
00180
00190   ;start to look for pulses
00200   ld br  jr    nz,end
00210          ld    b,00h
00220   ld st  call  05e7h    ;listen
00230          jr    nc,ld br
00240          ld    hl,0415h ;wait now
00250   ld wa  djnz  $
00260          dec   hl
00270          ld    a,h
00280          or    l
00290          jr    nz,ld wa
00300          call  05e3h   ;check still
00310          jr    nc,ld br ;pulsing
00320
00330   ;confirm on leader
00340   ld le  ld    b,0b0h
00350          call  05e3h
00360          jr    nc,ld br
00370          ld    a,0b4h ;too short?
00380          cp    b
00390          jr    nc,ld st
00400          ld    a,0d0h ;too long?
00410          cp    b
00420          jr    c,ld st
00430          inc   h
00440          jr    nz,ld le
00450
00460   ;now find each byte
00470   ld sy  ld    b,0b0h
00480          call  05e7h
00490          jr    nc,ld br
00500          ld    a,0beh
00510          cp    b
00520          jr    nc,ld sy ;until sync
00530          ld    b,0b0h
00540          call  05e7h    ;discard
00550          jr    nc,ld br
00560          ld    a,c
00570          and   0fch ;change colours
00580          bit   2,a
00590          jr    nz,ld cl
00600          or    03h
00610   ld cl  ld    c,a
00620
00630   ;get the bits of the byte
00640   ld 7   ld    h,07h ;7 bits/byte
00650          ld    l,00h ;collect in l
00660   loop   ld    b,0b0h
00670          call  05e3h
00680          ld    a,0c6h
00690          cp    b       ;0 v. 1
00700          push  af
00710          ld    b,0b0h
00720          call  nc,05e3h ;discard
00730          pop   af
00740          ccf   ;complement
00750          rr    l         ;save it
00760          dec   h
00770          jr    nz,loop  ;all byte?
00780
00790   ;now store byte
00800          srl   l  ;final shift
00810          ld    (ix+0),l ;store it
00820          inc   ix        ;step on
00830
00840   ;look for end
00850          ld    a,03h
00860          cp    l
00870          jr    z,end
00880          ld    a,7fh
00890          in    a,(0feh)
00900          rra
00910          jr    nc,end    ;read break
00920          ld    a,d
00930          or    e
00940          dec   de
00950          jr    nz,ld sy ;all done?
00960   end    jp    053fh    ;exit
```

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Microdrive catalogue

***John Santi** demonstrates the use of the Cat command for a catalogue listing of all files on Microdrive*

The *Cat* command in Sinclair Basic will list on the screen the names of the first 50 files stored on a microdrive cartridge. However, if a file has been saved with the 1st character of the filename set to *Chr$ 0*, this filename is ignored by the *Cat* command and not listed.

Having used this technique to save files and, at a later stage, being unable to load the files because of the names being forgotten, I devised a method to allow a catalogue listing of all files on a cartridge.

The *Cat* routine resides between locations 7256 and 7479 decimal (*1C58h* to *1D37h*) in the 8K shadow Rom. By copying the contents of the Rom to Ram memory, the code can be disassembled. On examining the code it can be seen that, with the exception of one instruction, a direct *Jump*, the routine is relocatable — that is, it can be run from any location in memory.

After modifying this single instruction to point to its correct new address, the routine was run from its new location and displayed a normal *Cat* list on the screen. Since the routine can run from Ram memory, it can be modified to operate in a different way.

The instructions at address 7301 decimal (*1C85h*), see Fig 1, test the 1st character of the filename for *Chr$ 0* and whether that value jumps to a point beyond the instructions which display the file name. By replacing the jump instruction with *Nops*, this modified *Cat* routine will display all the names of the files on the cartridge.

The following procedure will create a program which, when run, will produce a full *Cat* of a cartridge.

Step 1 — Enter and run the following command:

SAVE ☆ "m" ;1; "newrom" CODE 0,8192

This creates a *Code* file on microdrive 1 containing the 8K of machine code in the shadow Rom as, while the *Save ★* is being executed, the shadow 8K Rom is paged in.

Step 2 — Enter the program in Figure 2 with the cartridge containing "newrom" placed in drive 1. This program modifies the *Cat* routine and adds on the instructions to enable the routine to be used from Basic.

Step 3 — Enter the program in Figure 3 and save on the cartridge which contains "modrom" by using the instruction:

SAVE ★ "m" ;1; "fullcat"

To obtain a full catalogue of a cartridge, load the program "fullcat", insert the cartridge to be catalogued in drive 1 and Run the program. The screen display will show all the files. Those saved with *Chr$ 0* will have a *?* in the 1st character position of the name. Figure 4 shows a listing of the cartridge supplied with each microdrive on which I saved "example" with *Chr$ 0* in the 1st position.

For anyone who has access to an RS232 printer, the listing can be redirected to the printer by using the program in Figure 5 instead of the program in Figure 3.

The routine added in Step 2 to the 8K Rom sets up the stream number for the *Cat* output (2 for screen, 3 for ZX printer), pages in the 8K Rom, calls the new *Cat* routine, restores the system variables and then returns to Basic. Figure 6 shows an assembler listing of this routine.

Since most of the routines in the 8K Rom appear to be relocatable, it may be possible to modify other commands using this technique.

fig 1. ROM Routine

```
     LD     A,(IX+47)     : get 1st character of name
     OR     A             : test for all 0's
     JR     Z,address     : if 0's then skip displayroutine
```

fig 2. Modifier program.

```
 10 LOAD *"m";1;"newrom"CODE 32768
 20 POKE 40073,0: POKE 40074,0: POKE 40179,156
 30 FOR x=40960 TO 40980
 40 READ a
 50 POKE x,a
 60 NEXT x
 70 SAVE *"m";1;"modrom"CODE 32768,8213
 80 DATA 62,2,50,216,92,33,88,156
 90 DATA 34,237,92,217,229,217,207,50
100 DATA 217,225,217,251,201
```

fig 3. FULLCAT listing

```
 10 CLS
 20 LOAD *"m";1;"modrom"CODE
 30 RANDOMISE USR 40960
```

fig 4. Full CAT list.

```
Demo

????????
?example
?m will ma
Database
Dbase prog
P server
net game
run
title ( SCREEN$ )

66
```

fig 5. RS232 version

```
 5 REM change baud rate to suit printer
10 FORMAT "t";1200
20 OPEN #3;"t"
30 LOAD *"m";1;"modrom"CODE
40 POKE 40961,3
50 RANDOMIZE USR 40960
```

fig 6. Assembler listing of calling routine

```
LD     A,02          : stream no.
LD     (5CD8),A      : into system variable
LD     HL,9C58       : newcat address
LD     (5CED),HL     : into system variable
EXX                  : save H'L'
PUSH   HL            : registers
EX                   : on stack
RST    08            : page in shadow rom
DEFB   32            : and call 9C58
EXX                  : restore
POP    HL            : H'L'
EXX                  : registers
EI                   : restore interrupts
RET                  : return to BASIC
```

Booting a disc

***Brian Cadge** looks at the I/O functions of the disc drive from machine language*

This article looks at the I/O functions of the Dragon disc drive from machine language, in particular the *Boot* command.

If you've read the Dragon Dos manual very closely, you may have noticed that the *Boot* command exists to "load in another operating system". No other information is given, certainly not how to use the command, what it really does or how to produce a disc that can be *Booted*. If you try typing *Boot* with a normal disc inserted, you'll get a *BT Error* (Boot error).

In fact, the *Boot* command is a useful machine code loading command. Providing the disc in the drive is an OS disc (see later), typing *Boot* loads 4K of code in memory starting at address *9728* and then automatically executes it from address *9730*. As this can be any machine language program, it can relocate itself at the top of Ram, or load more code, although 4K is usually enough for a fair program.

The machine language program listed in assembly (and in the form of a Basic loader program for users without assemblers) will produce an example OS disc for you. The program that will be *Booted* only serves as an example and is not intended to be particularly useful, the important point is how a boot disc is prepared.

When you type the command *Boot*, the Dos reads sector 3 of track 0 — the first two bytes of this sector must be the Ascii codes for OS otherwise a *?BT Error* is generated. Provided it finds the OS flag, the following 4K of code is loaded from this position on the disc and is executed.

So, to produce an OS disc all that is needed is to write the code starting at address *9728* with 'OS' and save it to disc starting at track 0, sector 3. The normal *Save* command cannot be used as we have no control over where the code goes on the disc (this is handled by the Dos directory). A possible way is to use *Swrite*, but this involves a lot of tedious mucking about with strings, etc. The best method is to use the Rom routines that control the I/O of sectors on the disc drive.

As an OS disc should not contain any Basic, my program formats the disc before writing to it (hence any information previously on it will be lost), this is achieved by the Rom routine at 50108.

To save a sector of data (256 bytes) to disc, location 235 is set up to the drive number (default=1) — location 236 is the track and 237 the sector. Locations 238/239 point to the beginning of the data to be stored. The write routine starts at 49409. Referring to the assembly language program, it saves a sector at a time until the end of track one — this is not quite 4K, but is plenty for this short program. The program comments should help clarify what's going on. When it's finished, it returns to Basic.

The read routine is set up as the write routine, except location 238/239 points to the Ram where the data will be transfered to. The read routine starts at address 49412.

Although it is not used here, the zero flag is set if any error occurs (eg, disc not ready) when using the read/write routines.

To use the program, type in and run the Basic listing, taking care with the data statements. Then put a fresh disc in the drive and press any key. When the disc is completed 'OK' will appear. Having saved the Basic program to a different disc, turn the Dragon off and on, insert the OS disc and type *Boot*, the example program should then start itself up. Press *Break* to return to Basic.

This machine code routine can be used to produce your own OS discs. For example, I used it to produce a disc that, when *Booted*, sets up an inverse video text print routine (similar to that published last year in *PCW*). The important part of the program is that which starts at *@start* — this is relocatable, so your OS program which goes before this can be any length.

```
4E21               *
4E21               * PRODUCE AN EXAMPLE BOOT DISK
4E21               *
2600  2600                ORG    9728
2600 4F53          START  FCC    /OS/       BOOT FLAG
2602               *
2602               * THE PROGRAM HERE WILL EXECUTE
2602               * WHENEVER THE DISK IS 'BOOTED'
2602               *
2602 BDBA77               JSR    47735      DO A CLS
2605 8E262F               LDX    #TEXT-1    MESSAGE
2608 0F6F                 CLR    111        CHANNEL 0
260A BD90E5               JSR    37093      PRINT IT
260D BDBBE5        INKEY  JSR    48101      SCAN KEYS
2610 8103                 CMPA   #3         BREAK?
2612 2716                 BEQ    END
2614 8153                 CMPA   #'S        S KEY?
2616 2706                 BEQ    MOTON
2618 8145                 CMPA   #'E        E KEY?
261A 2709                 BEQ    MOTOFF
261C 20EF                 BRA    INKEY      NO KEY
261E 8604          MOTON  LDA    #4
2620 B7FF48               STA    $FF48
2623 20E8                 BRA    INKEY
2625 7FFF48        MOTOFF CLR    $FF48
2628 20E3                 BRA    INKEY
262A 7FFF48        END    CLR    $FF48      MOTOR OFF
262D 7E8371               JMP    33649      GOTO BASIC
22630 5448495320 TEXT   FCC /THIS IS A BOOT DISK/
2643 0D50524553  FCC 13,/PRESS S TO START AND/
2658 4520544F20  FCC /E TO STOP/,13,/MOTOR - /
266A 627265616B  FCC /break FOR BASIC./,0
267B               *
267B               * THIS PART OF THE PROGRAM SAVES
267B               * THE ABOVE BOOT PROGRAM TO DISK
```

```
267B                  * DISK WILL BE FORMATTED FIRST!
267B                  *
267B 4F               @START CLRA
267C BDC3BC                  JSR   50108    DSKINIT
267F 0FEC                    CLR   236      TRACK #
2681 8603                    LDA   #3
2683 97ED                    STA   237      SECTOR #
2685 8E2600                  LDX   #9728    START ADRS
2688 3410             SAVE   PSHS  X
268A 9FEE                    STX   238      BUFFER ADR
268C BDC101                  JSR   49409    WRITE DISK
268F 3510                     PULS  X
2691 30890100                LEAX  256,X
2695 0CED                    INC   237
2697 96ED                    LDA   237
2699 8113                    CMPA  #19
269B 25EB                    BLO   SAVE
269D 7E8371                  JMP 33649      GOTO BASIC
26A0
10 PCLEAR1
20 FORI=0 TO 159:READA$:POKE 9728+I,VAL("&H"+A$):NEXTI
30 PRINT"PRESS ANY KEY TO FORMAT/WRITE   TO BOOT DISK"
40 EXEC 41194
50 EXEC &H267B
60 END
100 DATA 4F,53,BD,BA,77,8E,26,2F,0F,6F,BD,90,E5,BD,BB,E5,81,03,27,16
110 DATA 81,53,27,06,81,45,27,09,20,EF,86,04,B7,FF,48,20,E8,7F,FF,48
120 DATA 20,E3,7F,FF,48,7E,83,71,54,48,49,53,20,49,53,20,41,20,42,4F
130 DATA 4F,54,20,44,49,53,4B,0D,50,52,45,53,53,20,53,20,54,4F,20,53
140 DATA 54,41,52,54,20,41,4E,44,45,20,54,4F,20,53,54,4F,50,0D,4D,4F
150 DATA 54,4F,52,20,2D,20,62,72,65,61,6B,20,46,4F,52,20,42,41,53,49
160 DATA 43,2E,00,4F,BD,C3,BC,0F,EC,86,03,97,ED,8E,26,00,34,10,9F,EE
170 DATA BD,C1,01,35,10,30,89,01,00,0C,ED,96,ED,81,13,25,EB,7E,83,71
```

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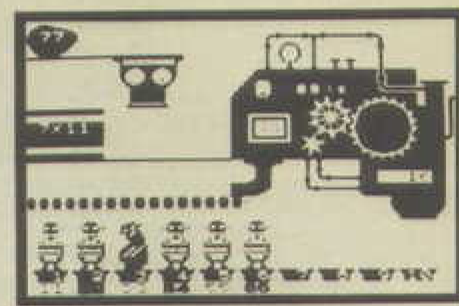
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Automatic loader

R Brown presents a loader program that does away with the need for several key presses

This short machine code program will allow you to automatically load a machine code program without the need for several keypresses.

I have provided extensive notes on the actual code in the hope that this will provide a simple introduction to the subject of machine code.

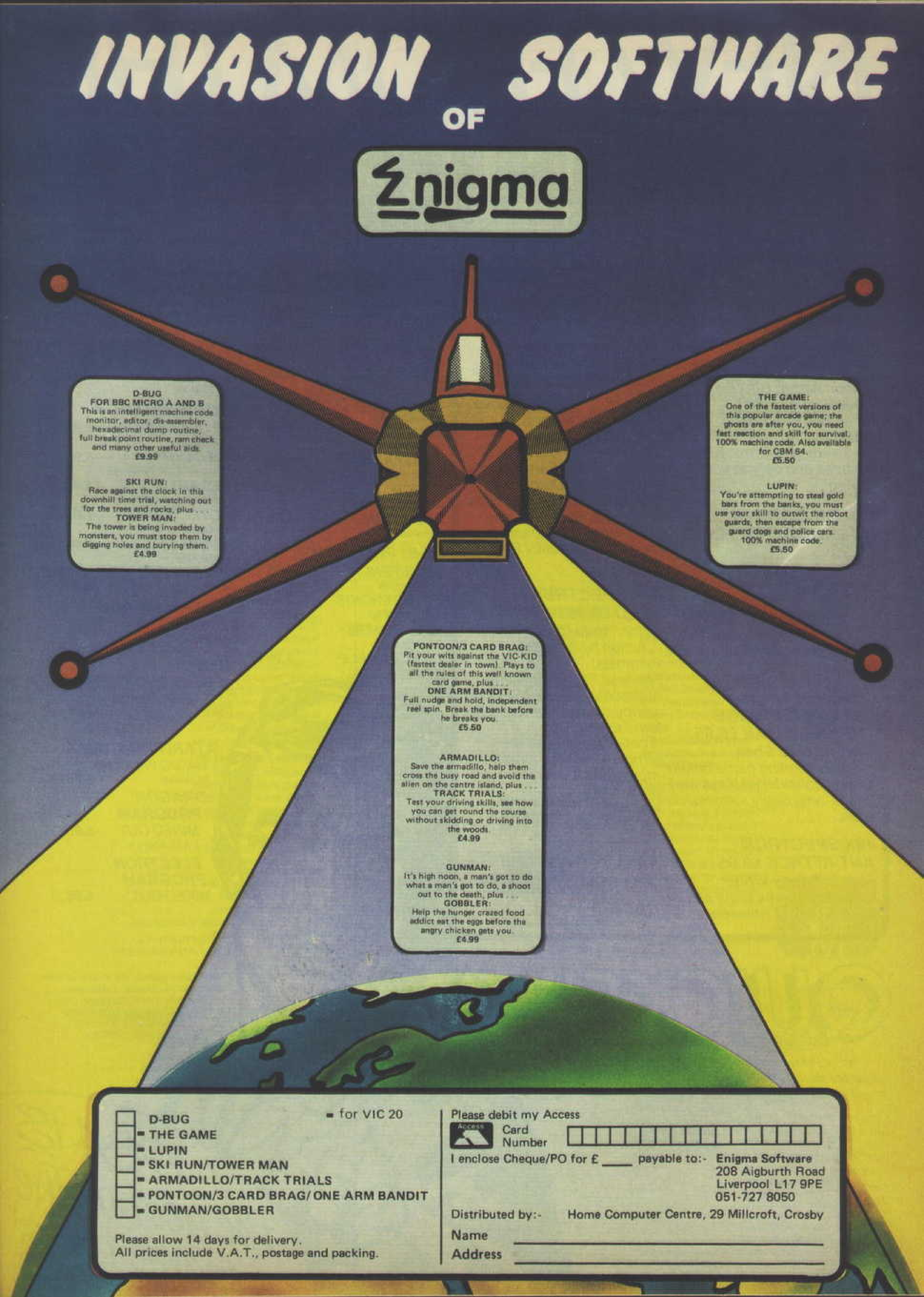
Similar loaders are often used in profesional programs where there are several files of code. For your reference, the figures in the third column of the disassembly represent the hexadecimal equivalents of the decimal numbers in the Data statements in the program.

```
100 REM ********************************
105 REM *                              *
110 REM *       BASIC LOADER FOR       *
115 REM *                              *
120 REM *   A U T O   R U N   CBM 64   *
125 REM *                              *
130 REM *   PROGRAM BY   R W BROWN.    *
135 REM *                              *
140 REM *         JANUARY 1984         *
145 REM *                              *
150 REM ********************************
1000 FORZ=49152TO49292
1010  READ A
1020  POKEZ,A
1030  B=B+A
1040 NEXT Z
1050 IF B<>16468 THENPRINT"?{CUR DN} ERROR TOTAL WAS ";B:STOP
1060 PRINT" CORRECT USE 'SYS49152' TO USE":END
1100 DATA162, 0, 189, 79, 192, 157, 167, 2, 232, 224, 80
1110 DATA208,245, 173, 2, 3, 141, 141, 192, 173, 3
1120 DATA 3, 141, 142, 192, 169, 2, 160, 167, 141, 3
1130 DATA 3, 140, 2, 3, 169, 0, 162, 1, 160, 1
1140 DATA 32, 186, 255, 169, 0, 32, 189, 255, 169, 167
1150 DATA 133, 43, 169, 2, 133, 44, 162, 10, 160, 3
1160 DATA 169, 43, 32, 216, 255, 173, 141, 192, 141, 2
1170 DATA 3, 173, 142, 192, 141, 3, 3, 96, 169, 1
1180 DATA 141, 32, 208, 169, 225, 141, 40, 3, 162, 0
1190 DATA 189, 220, 2, 157, 0, 128, 232, 224, 10, 208
1200 DATA 245, 169, 1, 162, 1, 160, 1, 32, 186, 255
2100 DATA 169, 0, 32, 189, 255, 169, 0, 162, 255, 160
2110 DATA 255, 32, 213, 255, 134, 45, 132, 46, 76, 0
2120 DATA 192, 167, 3, 0, 0, 195, 194, 205, 56, 48
2130 END
READY.
```

```
  5 0000      ! TO USE THIS AUTO RUN PROGRAM TYPE
 10 0000      ! IN THE BASIC LOADER  AND THEN SAVE IT
 15 0000      !           YES SAVE IT FIRST
 20 0000      ! NOW RUN IT. IF ALL IS WELL 'CORRECT'
 25 0000      ! WILL BE PRINTED ON THE SCREEN.
 30 0000      ! NOW POSITION A BLANK TAPE INTO
 35 0000      ! YOUR RECORDER AND TYPE
 40 0000      ! SYS49152 (RETURN)
 45 0000      ! PRESS PLAY AND RECORD AS REQUESTED
 50 0000      ! WHEN THE SCREEN RETURNS STOP THE TAPE
 55 0000      ! BUT DO NOT REWIND IT. YOU NOW HAVE A
 60 0000      ! SHORT LOADER WHICH WILL LOAD THE NEXT
 65 0000      ! PROGRAM ON THE TAPE. IF YOU POSITION
 70 0000      ! YOUR MACHINE CODE PROGRAM AT $C000
 75 0000      ! OR 49152 THE IT WILL BE CALLED AFTER
 80 0000      ! THE LOAD HAS FINISHED. YOU WILL ALSO
 85 0000      ! FIND THE RUN/STOP RESTORE IS DISABLED
 90 0000      ! AND USEING A RESET SWITCH LOADS THE
 95 0000      ! NEXT PROGRAM.
 96 0000      !
 97 0000      !
 98 0000      !
 99 0000      !
100 0000      ! ********************************
105 0000      ! *                              *
110 0000      ! *     A U T O  L O A D E R     *
115 0000      ! *                              *
120 0000      ! *          WRITTEN BY          *
125 0000      ! *                              *
130 0000      ! *         R. W.  BROWN         *
135 0000      ! *                              *
140 0000      ! * TO USE - AFTER  ASSEMBLY  AT *
145 0000      ! * 49152 ($C000) THEN  SYS49152 *
150 0000      ! * THIS WILL THEN SAVE A LOADER *
155 0000      ! * TO TAPE.  THIS  LOADER  WILL *
160 0000      ! * AUTO START AND LOAD THE NEXT *
162 0000      ! * PROGRAM ON  THE  TAPE  WHICH *
163 0000      ! * SHOULD START AT $C000.       *
165 0000      ! *                              *
170 0000      ! *   (C) COPYRIGHT  R W BROWN   *
185 0000      ! *                              *
186 0000      ! *         JANUARY  1984        *
187 0000      ! *                              *
195 0000      ! ********************************
500 0000      !
510 0000      !
520 0000      ! START ADDRESS
530 0000      ! AT 49152 DECIMAL
535 0000      !
537 0000      !
540 C000      *=$C000
550 C000      !
560 C000      !
570 C000      !
580 C000      !
1000 C000     ! START BY MOVING LOADER TO $02A7
1001 C000     ! THIS IS WHERE THE PROG WILL GO
1002 C000     ! WHEN LOADED IN AGAIN.
```

```
1003 C000            !
1004 C000            !
1005 C000            ! READ OFF PROGRAM AND REPOSITION
1006 C000            !
1007 C000            !
5000 C000 A200                  LDX ##00
5010 C002 BD4FC0 RELOCATE       LDA DATA,X
5020 C005 9DA702                STA $02A7,X
5030 C008 E8                    INX
5040 C009 E050                  CPX #80
5050 C00B D0F5                  BNE RELOCATE
5051 C00D            !
5052 C00D            !
5053 C00D            ! GET AND STORE OLD 'WARM START'
5054 C00D            ! POINTER UNTIL END OFF LOAD
5055 C00D            !
5056 C00D            !
5060 C00D AD0203                LDA $0302
5070 C010 8DBDC0                STA FINISH
5080 C013 AD0303                LDA $0303
5090 C016 8DBEC0                STA FINISH+1
5091 C019            !
5092 C019            !
5093 C019            ! SET UP AND STORE NEW 'WARM START'
5094 C019            ! POINTERS IN $0302 & $0303
5095 C019            !
5096 C019            !
5100 C019 A902   RELOC          LDA ##02
5110 C01B A0A7                  LDY ##A7
5120 C01D 8D0303                STA $0303
5130 C020 8C0203                STY $0302
5131 C023            !
5132 C023            !
5133 C023            ! SET UP AND CALL KERNAL ROUTINE
5134 C023            ! TO INITIAISE SECONDARY ADDRESS
5135 C023            ! IE.      SAVE"",1,1
5136 C023            ! SO THAT THE PROGRAM WILL NOT
5137 C023            ! RELOCATE WHEN LOADED BACK IN
5138 C023            !
5139 C023            !
5140 C023 A900   SAVER          LDA ##00
5150 C025 A201                  LDX ##01
5160 C027 A001                  LDY ##01
5170 C029 20BAFF                JSR $FFBA
5171 C02C            !
5172 C02C            !
5173 C02C            ! CALL KERNAL ROUTINE TO SET
5174 C02C            ! UP A NAME. THE LOADER WILL
5175 C02C            ! HAVE NO NAME.
5176 C02C            !
5177 C02C            !
5180 C02C A900                  LDA ##00
5190 C02E 20BDFF                JSR $FFBD
5191 C031            !
5192 C031            !
5193 C031            ! SET UP AND CALL KERNAL ROUTINE
5194 C031            ! TO SAVE"",1,1 FROM $02A7-$030A
5195 C031            !
5196 C031            !
5200 C031 A9A7                  LDA ##A7
5210 C033 A002                  LDY ##02
5220 C035 852B                  STA $2B
5230 C037 842C                  STY $2C
5240 C039 A20A                  LDX ##0A
5250 C03B A003                  LDY ##03
5260 C03D A92B                  LDA ##2B
5270 C03F 20D8FF                JSR $FFD8
5271 C042            !
5272 C042            !
5273 C042            ! TIDY UP REPOINT WARM START
5274 C042            ! TO ITS ORIGNAL LOCATION
5275 C042            !
5276 C042            !
5280 C042 ADBDC0                LDA FINISH
5290 C045 8D0203                STA $0302
5300 C048 ADBEC0                LDA FINISH+1
5310 C04B 8D0303                STA $0303
5311 C04E            !
5312 C04E            !
5313 C04E            ! RETURN TO BASIC STOP THE TAPE
5314 C04E            ! TURN OFF THE CBM 64 AND THEN
5315 C04E            ! LOAD AND SAVE YOUR PROGRAM
5316 C04E            !
5317 C04E            !
5320 C04E 60                    RTS
5330 C04F            !
5340 C04F            !
5350 C04F            !------------------------------
5351 C04F            !
```

```
5352 C04F            !------------------------------
5353 C04F            !
5354 C04F            !
5355 C04F            !
5356 C04F            ! START OF AUTO LOADER
5357 C04F            ! CHANGE BORDER COLOUR WHITE
5358 C04F            !
5359 C04F            !
5360 C04F A901   DATA           LDA ##01
5370 C051 8D20D0                STA $D020
5371 C054            !
5372 C054            !
5373 C054            ! DISABLE RUN/STOP AND RESTORE
5374 C054            !
5375 C054            !
5380 C054 A9E1                  LDA #225
5390 C056 8D2803                STA $0328
5391 C059            !
5392 C059            !
5393 C059            ! SET UP AUTO START AGAINST
5394 C059            ! THOSE NASTY PEOPLE WITH
5395 C059            ! RESET SWITCHES.
5396 C059            ! START AT $8000.
5397 C059            !
5399 C059            !
5400 C059 A200                  LDX ##00
5410 C05B BDDC02 AUTOCBM        LDA $02DC,X
5420 C05E 9D0080                STA $8000,X
5430 C061 E8                    INX
5440 C062 E00A                  CPX ##0A
5450 C064 D0F5                  BNE AUTOCBM
5451 C066            !
5452 C066            !
5453 C066            ! SET UP AND CALL KERNAL ROUTINE
5454 C066            ! TO INITIAISE SECONDARY ADDRESS
5455 C066            ! IE.      LOAD"",1,1
5456 C066            ! SO THAT THE PROGRAM WILL NOT
5457 C066            ! RELOCATE WHEN LOADED BACK IN
5458 C066            !
5459 C066            !
5460 C066 A901                  LDA ##01
5470 C068 A201                  LDX ##01
5480 C06A A001                  LDY ##01
5490 C06C 20BAFF                JSR $FFBA
5491 C06F            !
5492 C06F            !
5493 C06F            ! CALL KERNAL ROUTINE TO SET
5494 C06F            ! UP A NAME. THE LOADER WILL
5495 C06F            ! LOAD IN FIST PROGRAM.
5496 C06F            !
5497 C06F            !
5500 C06F A900                  LDA ##00
5510 C071 20BDFF                JSR $FFBD
5511 C074            !
5512 C074            !
5513 C074            ! CALL KERNAL ROUTINE TO
5514 C074            ! LOAD PROGRAM
5516 C074            !
5517 C074            !
5520 C074 A900                  LDA ##00
5530 C076 A2FF                  LDX ##FF
5540 C078 A0FF                  LDY ##FF
5550 C07A 20D5FF                JSR $FFD5
5560 C07D 862D                  STX $2D
5570 C07F 842E                  STY $2E
5571 C081            !
5572 C081            !
5573 C081            ! CALL NEW PROGRAM AT
5574 C081            ! $C000 AND RUN IT
5576 C081            !
5577 C081            !
5580 C081 4C00C0                JMP $C000    ! CALL PROG
5581 C084            !
5582 C084            !
5583 C084            ! DATA FOR WARM START
5584 C084            ! COLD START 'CBM' WITH
5586 C084            ! BIT 7 SET AND '80' IN
5587 C084            ! ASSCI FORM.
5588 C084            !
5589 C084            !
5590 C084 A70300 DATA2          BYT $A7,03,00,00
5600 C088 C3C2CD                BYT 'C+128,'B+128,'M+128
5610 C08B 3830                  TXT "80"
5621 C08D            !
5622 C08D            !
5625 C08D            ! LABLE TO STORE POINTERS
5626 C08D            !
5627 C08D            !
5630 C08D EA     FINISH         NOP
```


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Open Forum

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the _Program of the Week_ double our new fee of £6 for each program published.

Security

on Dragon

The purpose of the program is to convert a message or data into a coded form, which can then be decoded by the recipient. Despite using a very simple system, the coding is really quite secure.

It works like this: a 'keyword' is chosen, which may be any alphanumeric string not using the letters F, P or Z. A new string is formed by concatenating the ASCII values of the letters.

The message is then examined, one letter at a time. The ASCII of the first letter is multiplied by the first digit of the coding string (by 'VAL'), and the product gives the first three-digit group in the coded message.

Each three-digit number in the coded version thus represents one character in the original message.

The ASCII of the second letter of the message is then multiplied by the second digit in the coding string, and so on. When all the digits have been used, it starts again from the beginning.

Most of the program is concerned with input and output. The 'Guts' are lines 200-240 (keyword), 300-330 (encoding), and 380-400 (decoding). The 'code-phrase' could be something like 'Your middle name' or 'Your car license number', or it could be omitted and an agreed keyword used instead. The example below the listing is the coded version of a Robert Frost poem. The listing was produced on a Seikosha GP-100A. For £ read hash sign.

```
1  '************* CRYPTO ****************
2  '*** ENCRYPTION/DECRYPTION PROGRAM ***
3  '********** FOR THE DRAGON 32 *********
4  '******** (C) 1984 IAN BENNETT ********
5  '***** UNICORN COMPUTER SERVICES *****
10 CLEAR10000:CLS
20 PRINT"MODE:-"
30 PRINT"           ENCODE: 1"
40 PRINT"           DECODE: 2"
50 INPUT"                 ";E
60 PRINT"INPUT CHANNEL:-"
70 PRINT"         TERMINAL: 0"
80 PRINT"         TAPE    : 1"
90 INPUT"                 ";IC
100 PRINT:PRINT"OUTPUT CHANNEL:-"
110 PRINT"        TERMINAL: 0"
120 PRINT"        TAPE    : 1"
130 PRINT"        PRINTER : 2"
140 INPUT"                ";OC
150 IFE=1ANDIC=1THENPRINT"  DATA FOR ENCODING CANNOT BE        ACCEPTED FROM TA
PE":PRINT"             HIT ANY KEY":EXEC41194:RUN
160 IFIC=1THENPRINT"   SET TAPE TO 'PLAY' THEN HIT            ANY KEY":EXEC41194
170 IFOC=1THENPRINT"  SET TAPE TO 'RECORD' THEN HIT           ANY KEY":EXEC41194
180 OPEN"O",£-OC,""
190 OPEN"I",£-IC,""
200 IFIC=1THENINPUT£-1,C$:CLS:PRINT"CODE PHRASE IS:- ":PRINTC$
210 PRINT"ENTER KEYWORD (NO 'F','P' OR 'Z')":INPUTK$
220 FORL=1TO(LEN(K$))
230 A$=A$+RIGHT$(STR$(ASC(MID$(K$,L,1))),2)
240 NEXT
250 ON E GOTO260,340
260 OPEN"O",£-CH,""
270 LINEINPUT"ENTER A CODE PHRASE FOR KEYWORD ";C$:PRINT£-OC,"CODE PHRASE IS "+C
$
280 K=1:CLS
290 LINEINPUT"MESSAGE ('ZZZ' TO END,'?/?' FOR LINE FEED) ";M$:IFM$="ZZZ"THENPRIN
T£-OC:CLOSE£-OC:ENDELSEIFM$="?/?"THENM$=CHR$(13)
300 M=1
310 PRINT£-OC,ASC(MID$(M$,M,1))*VAL(MID$(A$,K,1));
320 M=M+1:K=K+1:IFK>LEN(A$)THENK=1
330 IFM=<LEN(M$)THEN310ELSE290
340 K=1:CLS
350 IFIC=0THENPRINT"NUMBER GROUP (9999 TO END)"
360 IFIC=0THEN380
370 IF EOF(-1) THENPRINT£-OC:CLOSE£-1:END
380 IFIC=1THENINPUT£-1,D ELSEINPUTD:IFD=9999THENEND
390 PRINT£-OC,CHR$(D/VAL(MID$(A$,K,1)));
400 K=K+1:IFK>LEN(A$)THENK=1
410 GOTO360

CODE PHRASE IS MAKER OF GP-100A PRINTER
 672  312  606  288  833  333  777  500  805  288  776  342  707  64  648  555
944  303  648  1089  308  300  679  570  749  288  776  330  700  64  600  505
808  336  264  117  462  351  812  160  511  288  832  291  826  202  192  560
912  333  654  945  805  303  805  160  812  999  256  321  707  202  672  220
104  195  660  900  224  327  735  540  707  1035  256  348  777  64  618  555
256  294  606  918  777  342  707  160  511  288  920  324  707  202  672  230
976 366 732
```

Security
by Ian Bennett

Open Forum

Hall of Fame

on Vic 20

This is not a program in its own right, but a routine to include at the end of your own programs to give the Top Ten best scores. In the listing Line 10 is used solely for you to input scores to test that the program is running correctly. Line 20 would be a decision taken at the end of your program as to whether the score obtained, Y was high enough and if not line 30 would just show the current state of the Top Ten. Line 9570 would need to be changed to redirect you back to the start of the game.

Program notes

Line	
10	Simulates a score being attained.
20	Is the score in the Top Ten?
30	Score not in Top Ten, Just show the current position

Having input your score, the program waits for you to press three keys (simulating input of initials)

9000-9060	Takes each key in turn and prints it on the screen, waiting for each key to be pressed. It then adds them together to make M$.
9070-9090	Determines your ranking in the top 10
9100-9120	Moves the scores and corresponding initials down to make room for your score
9130	Puts your score and initials in the correct position
9500-9550	Prints the top ten scores
9560	Holds the screen showing the Hall of Fame
9570	Line to redirect back to start of program

```
10 PRINT"■WHAT WAS YOUR SCORE";:INPUTY
20 IFY>SC(10)THEN9000
30 GOTO9500
9000 GETA$:IFA$=""THEN9000
9010 PRINTA$
9020 GETB$:IFB$=""THEN9020
9030 PRINT"■■";B$
9040 GETC$:IFC$=""THEN9040
9050 PRINT"■■";C$
9060 M$=A$+B$+C$
9070 FORL=1TO10
9080 IFY>SC(L)THENP=L:L=10
9090 NEXT
9100 FORR=10TOP+1STEP-1
9110 SC(R)=SC(R-1):SC$(R)=SC$(R-1)
9120 NEXT
9130 SC(P)=Y:SC$(P)=M$
9500 PRINT"■■■■■HALL OF FAME":PRINT
9530 FORL=1TO10
9540 PRINTL:PRINT"■■■";SC(L),SC$(L)
9550 NEXT
9560 GETQ$:IFQ$=""THEN9560
9570 GOTO10
```

Hall of Fame
by M Dixon

Space Walk

on Vic 20

This program is for the unexpanded machine. The program prints a random asteroid field. You are at the top of the asteroids. You have got to get to the bottom, where there is a little circle.

When you are at the bottom you have to jump on to the circle, and you have made it. Then it will play a melody and print up your moves and the least amount of moves. The computer will tell you whether you are a space cadet warrior or captain or supreme commander. If you do not make it, it will make the sound of a explosion and ask if you want another go.

Program notes

Lines	
10-40	Sets up screen & variables
41-90	Instrucions
97-140	Draws game
150-220	Movement
250-300	Works out if crashed or survived
550-578	Crash & sound for crash
580-590	Play again
600-640	Survived & sound for survived; work out ranking
700-1040	Sound for begin
1100-1130	Title

```
10 POKE36879,95:GOSUB 1100
20 V=0:M=0:S=100000
30 E=INT(22*RND(1)+7702)
40 H=INT(22*RND(1)+8164)
41 POKE 36879,78:PRINT"■■■■■■■■■■■■■■■DO YOU WANT"
42 PRINT"■■■INSTUCIONS (Y/N)"
43 GETLG$:IF LG$=""THEN43
44 IF LG$="Y"THEN50
49 GOTO97
50 PRINT"■■■■■******■■SPACE WALK■■******";
51 PRINT"■*                    *";
52 PRINT"* YOU ARE A SPACE     *";
53 PRINT"* SHIP (*) AT THE     *";
54 PRINT"* TOP OF THE SCREEN   *";
55 PRINT"* TRYING TO GET       *";
56 PRINT"* THROUGH THE MAZE    *";
57 PRINT"* OF ASTEROIDS AND    *";
58 PRINT"* THE BLACK HOLE.YOU  *";
59 PRINT"* MAY FIND THAT SOME  *";
60 PRINT"* TIMES IT IS IMPOS-  *";
61 PRINT"* SIBLE TO PASS       *";
62 PRINT"* SO YOU HAVE GOT     *";
63 PRINT"*    3 LAZER SHOTS.   *";
64 PRINT"*                     *";
65 PRINT"*  ****************   *";
66 PRINT"*                     *";
67 PRINT"*  U-UP      N-DOWN   *";
68 PRINT"*  H-LEFT    J-RIGHT  *";
69 PRINT"*                     *";
70 PRINT"*  SPACE BAR-FIRE     *";
71 PRINT"**********************";
90 FORU=0TO12000:NEXTU
97 PRINT"■■":FORI=1TO700:NEXT
100 POKE36879,218
110 FORA=1TO250
120 B=INT(462*RND(1)+7724)
130 POKEB,42
140 NEXTA
150 POKEH,87:GETA$
160 POKEE,88
170 IFA$="N"THENG=22:GOTO250
180 IFA$="U"THENG=-22:GOTO250
190 IFA$="H"THENG=-1:GOTO250
200 IFA$="J"THENG=1:GOTO250
210 IFA$=" "THENGOSUB1000
220 GOTO150
250 M=M+1
260 POKEE,32:E=E+G
270 IFPEEK(E)=42THEN550
280 POKEE,88
290 IFE=HTHEN600
300 GOTO150
550 POKE36879,125:PRINT"■■■■■■■■■■■YOU HIT AN ASTEROID"
572 POKE36877,220
573 FORL=15TO0STEP-1
574 POKE 36878,L
575 FORM=1TO300
576 NEXTM,L
577 POKE 36877,0
578 POKE 36878,0
580 PRINT"■■■■■■■■■■DO YOU WANT "
581 PRINT"■■TO PLAY  AGAIN (Y/N)"
582 GET G$:IFG$=""THEN582
588 IFG$="N"THENEND
589 PRINT"■"
590 GOTO20
600 POKE36879,25:PRINT"WELL DONE!YOU DID NOT COLLIDE"
601 IF M>25THENGH$="SUPREME COMMANDER"
602 IF M>35THENGH$="SPACE CAPTAIN"
603 IF M>45THENGH$="SPACE WARRIOR"
604 IF M>55THENGH$="SPACE CADET"
610 PRINT"YOU MADE IT IN"M"     MOVES."
615 PRINT"YOU ARE A              ";GH$
620 IFM<STHENS=M
630 PRINT"LEAST MOVES= "S
631 POKE 36878,15
```

```
632 FORL=1TO100
633 POKE 36876,INT(RND(1)*128)+128
634 FORM=1TO10
635 NEXTM,L
636 POKE 36876,0
637 POKE 36878,0
640 GOTO580
700 POKE 36878,10:S=36874:X=36876
710 FOR Z=1TO29
720 READA
730 POKES,A
740 READA
750 FORT=1TO150:NEXTT
760 POKE X,A
770 NEXTZ
780 RETURN
790 DATA 215,215,225,225,225,215,231,231,231,
    231,231,231,232,228,228,228,231,22 5,225
800 DATA 225,228,219,219,219,219,223,215,215,215,
    215,225,225,225,225,215,215,231,231
810 DATA 231,231,231,235,228,228,228,231,225,225,
    225,226,219,223,222,225,215,0,0,0
1000 IFV<3THENGOTO1020
1010 GOTO150
1020 POKEE+1,32:POKEE-1,32
1030 POKEE+22,32:POKEE-22,32:V=V+1:M=M+4
1040 RETURN
1100 PRINT"                        "
1110 PRINT"          SPACE WALK   "
1120 PRINT"          "
1130 GOTO700
READY.
```

Space Walk
by A Bissenden

Superman

on Spectrum

In this program for the ZX spectrum (16K) you play the part of Superman, flying above the landscape when you see a group of radioactive space mines. If you manage to dodge them you score points, but the radiation damages your eyesight; this time you do not see the mines until they are much closer.

If you beat the computer then there is a surprise waiting for you (Capital letters are entered in graphics mode.) Use keys 6 & 7 to go up and down.

Program notes

10-245	Graphics
250-330	Title page
346	Landscape
350-415	Variables
416-430	Main loop
510	Movement
550-580	Death
585-603	Steps up onto next level
1000-end	Suprise

```
   1 REM a
   2 LET score=0
  10 POKE USR "a"+0,BIN 0
  15 POKE USR "a"+1,BIN 0
  20 POKE USR "a"+2,BIN 01110000
  25 POKE USR "a"+3,BIN 01111000
  30 POKE USR "a"+4,BIN 01110000
  35 POKE USR "a"+5,BIN 11000000
  40 POKE USR "a"+6,BIN 11111110
  45 POKE USR "a"+7,BIN 11111111
  50 REM b
 110 POKE USR "b"+0,BIN 0
 115 POKE USR "b"+1,BIN 0
 120 POKE USR "b"+2,BIN 11111100
 125 POKE USR "b"+3,BIN 00111111
 130 POKE USR "b"+4,BIN 00001111
 135 POKE USR "b"+5,BIN 00000001
 140 POKE USR "b"+6,BIN 01011111
 145 POKE USR "b"+7,BIN 10111111
 150 REM c
 210 POKE USR "c"+0,BIN 00000000
 220 POKE USR "c"+2,BIN 00000000
 225 POKE USR "c"+3,BIN 00000000
 230 POKE USR "c"+4,BIN 00011000
 235 POKE USR "c"+5,BIN 00111100
 240 POKE USR "c"+6,BIN 00111100
 245 POKE USR "c"+7,BIN 00011000
 250 REM program
 260 INK 7: PAPER 0: BORDER 0: C
LS
 265 PRINT AT 7,12;"BA"
 270 PRINT AT 10,10;"SUPERMAN"
 280 PRINT AT 10,10; OVER 1;"____
____"
 290 PRINT AT 15,10;"© D.Taylor"
 300 PRINT AT 16,10;"1983."
 310 FOR a=1 TO 50: BEEP .1,a: N
EXT a
 320 PRINT '''"Press a key to st
art."
 330 IF INKEY$="" THEN GO TO 330
 340 REM start game
 345 CLS
 346 PLOT 0,30: DRAW 255,0
 350 LET a=11
 355 LET w=10
 360 PRINT AT a,w;"BA"
 370 DIM z(30)
 380 LET g=INT (RND*30)+1
 390 FOR v=1 TO 30
 400 LET z(v)=INT (RND*18)
 410 NEXT v
 415 LET h=30
 416 FOR m=1 TO g
 417 PRINT AT z(m),h+1;" "
 418 PLOT 0,30: DRAW 255,0
 420 PRINT AT z(m),h;"C"
 425 IF INKEY$<>"" THEN GO SUB 5
00
 430 NEXT m
 436 IF SCREEN$ (a,w+2)<>" " THE
N GO TO 550
 440 LET h=h-1
 441 IF h<4 THEN GO TO 600
 450 GO TO 416
 500 PRINT AT a,w;"  "
 510 LET a=a+(INKEY$="6" AND a<2
0)-(INKEY$="7" AND a>1)
 520 PRINT AT a,w;"BA"
 530 RETURN
 550 PRINT AT a,w;"=="
 560 PRINT AT a,w; OVER 1;"BA"
 570 PRINT AT a,w; OVER 1;"**"
 575 PAUSE 1: PAUSE 80
 580 PRINT AT a,w;"  "
 585 PRINT ''''''"Score=";score
 590 STOP
 600 PRINT "WELL DONE!": PRINT "
Now it gets harder!!!"
 601 LET score=score+g: LET w=w+
4: CLS
 602 IF w>30 THEN PRINT "You hav
e beat me!": GO TO 1000
 603 GO TO 360
1000 CLS : PRINT AT 10,10;"BA"
1005 PRINT ''''"You are good "SU
PERMAN!""
1007 PAUSE 100
1010 FOR a=0 TO 10: PRINT AT a,1
1;"C"
1020 PAUSE 10
1030 PRINT AT a,11;" "
1040 NEXT a
1050 PRINT AT 10,10; OVER 1;"##"
1060 PRINT AT 10,10; OVER 1;"@@"
1070 PAUSE 200
1080 PRINT '''''''''"BUT NOT GOO
D ENOUGH!!"
1090 PRINT "Score=";score
1100 STOP
```

Superman
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Pontoon

on Dragon

Pontoon is based on the card game. The computer has the bank and gives you a credit of 100 to start. If you get over 1000 the bank will be bankrupt. Aces can count as 1 or 11, five cards win. You can twist or stick, but not under 16. Cards are printed in text mode.

Program notes

Lines		
60	100	Sets up cards
110	210	Title page
220	410	Prints up first two cards and rest of screen
420	430	Checks to see if cards are aces
560	670	Asks if extra cards required & prints it
680	910	Prints computers cards
920	980	Decides who has won
1000	1100	Subroutine which prints cards
1120	1230	Prints who has won & asks if another game is required

```
10 '****************************
20 '******* PONTOON ************
30 '****************************
40 '*****BY Russell Newby*******
50 '****************************
60 M$=CHR$(129)+CHR$(131)+CHR$(131)+CHR$
(131)+CHR$(130)
70 M2$=CHR$(133)+CHR$(143)+CHR$(42)+CHR$
(143)+CHR$(138)
80 M3$=CHR$(133)+CHR$(42)+CHR$(143)+CHR$
(42)+CHR$(138)
90 M4$=CHR$(133)+CHR$(143)+CHR$(143)+CHR
$(143)+CHR$(138)
100 M5$=CHR$(132)+CHR$(140)+CHR$(140)+CH
R$(140)+CHR$(136)
110 CLS5
120 PRINT@74,"PONTOON";
130 PRINT@106,STRING$(7,CHR$(195));
140 P=167:X=10
150 GOSUB 1000
162 P=174:X=11
170 GOSUB 1000
180 PRINT@463,"BY RUSSELL NEWBY";
190 FOR T=1 TO 1000:NEXT T
200 C=100
210 G1=0
220 CLS3
230 SOUND 100,5
240 IF C<1 THEN 1150
250 IF C>1000THEN 1130
260 P=128
270 J=2
280 Y=0
290 F=6
300 G1=G1+1
310 PRINT@9,"PONTOON";
320 PRINT@64,"YOUR CREDIT IS ";C;
330 PRINT@503,"GAME:";G1;
340 A=RND(10)+1
350 B=RND(10)+1
360 IF A=1AND B=1 THEN 350
370 X=A
380 GOSUB 990
390 X=B
400 GOSUB990
410 S=11
420 IF A=1OR A=11 THENPRINT@352,"YOU HAV
E AN ACE DO YOU WANT IT  TO BE A 1 OR 11
";G$="O3ECGDEABDGFGCDEFECFDEF":PLAY"T10
0V25"+G$:INPUTS:A=S:IF A<>11 AND A<>1 TH
EN PRINT@384,"YOU CHEAT"; FORD=1TO1000:N
EXT:A=11 :GOTO420
430 IF B=1 OR B=11 THEN PRINT@352,"YOU H
AVE AN ACE WOULD YOU LIKE  IT TO BE A 1
OR 11";G$="O3ECGDEABDGFCDEFECFDEF":PLAY
"T100V25"+G$:INPUT S:B=S:IF B<>11 AND B
<>1 THEN PRINT@384,"YOU CHEAT"; FORD=1TO
1000:NEXT:B=11:GOTO430
440 PRINT@352,"PLEASE ENTER HOW MUCH YOU
 WANT  TO BET"
450 INPUT R
460 PRINT@416," "
470 SOUND 150,1
480 IFR>C THEN 450
490 Y=A+B:IF Y=21 THENG$="O4CDEFGABO3CDE
FGABO1CDEFGAB":PLAY"T60V25"+G$: PRINT@35
2," PONTOON!!!":PRINT@384," ":FOR W=1 TO
 1400:NEXT W:GOTO680
500 PRINT@352,"IF YOU WANT TO TWIST THEN
 PRESS T IF NOT PRESS N"
510 D$=INKEY$
520 IFD$="T"THEN 560
530 IF D$="N"AND Y<16 THEN PRINT@352,"YO
U CAN NOT STICK":PRINT@384," ":FOR W=1TO
1400:NEXT W:GOTO500
540 IF D$="N"THEN 680
550 GOTO510
560 'EXTRA CARD
570 T=RND(10)+1
580 X=T
590 GOSUB990
600 Z=11
610 IF T=1 OR T=11THEN PRINT@384,"YOU HA
VE AN ACE 1 OR 11":G$="O3ECGDEABDGFCDEFE
CFDEF":PLAY"T100V25"+G$:INPUTZ:T=Z:IF T<
>11 AND T<>1THEN PRINT@384,"YOU CHEAT";
FORD=1TO1000:NEXT:T=11:GOTO610
620 PRINT@384,"T IF NOT PRESS N"
630 PRINT@416," "
640 Y=Y+T
650 J=J+1:IF J=5AND Y<22THENG$="O1BAGFED
CO3BAGFEDCO4BAGFEDC":PLAY"T60V25"+G$:PRI
NT@352,"YOU HAVE GOT A FIVE CARD TRICK":
PRINT@384," ":FOR D=1 TO1400:NEXTD:GOTO6
80
660 IF Y>21 THEN G$="O3DDDCCCO1DDDCCC":P
LAY"T5V25"+G$: PRINT@352,"YOU'VE BUST":P
RINT@384," ":FOR W=1 TO 1400:NEXT W:C=C-
R:GOTO220
670 GOTO510
680 CLS3
690 G=0
700 FOR P=1 TO 10
710 SOUND P*5,1
720 NEXT P
730 PRINT@9,"COMPUTERS TURN";
740 P=128
750 G=0
760 FOR N=1 TO 2
770 K=RND (10)+1
780 X=K
790 GOSUB990
800 G=G+K
810 IF K=11 AND G>=11 THEN K=1
820 IF K=11 AND G<=10 THEN K=11
830 NEXT N
840 IF G<16 AND G<21THEN V=RND(10)+1:X=V
:GOSUB990 ELSE GOTO 920
850 IFV=11 AND G>=11THENV=1
860 IF V=1 AND G<=10 THEN V=11
870 G=G+V
880 IF G>21 THEN PRINT@352,"THE BANK'S B
UST":C=C+R: FOR B=1 TO 8000:NEXT B:GOTO
220
890 IF G>15 AND G<22 THEN 920
900 FOR H=1 TO150:NEXTH
910 GOTO 840
920 IF G>Y AND J<5THEN PRINT@352,"THE BA
NK WINS":C=C-R
930 IF G=21AND A+B=21 THENPRINT@352,"YOU
 WIN WITH A PONTOON":C=C+R
940 IFG=Y AND J<5THENPRINT@352,"THE BANK
```

Open Forum

```
PLAYS PLUS ONE              THE BANK WINS"
;:C=C-R
950 IF Y>G AND J<5 THEN PRINT@352,"YOU W
IN";:C=C+R
960 IF J=5 THEN PRINT@384,"YOU WIN WITH
5 CARDS UNDER 21";:C=C+R
970 FOR T=1 TO 3000:NEXT T
980 GOTO220
990 PRINT@P-32,X;
1000 IF X=1ORX=11 THEN PRINT@P,M$;:PRINT
@P+32,M4$;:PRINT@P+64,M4$;:PRINT@P+96,M2
$;:PRINT@P+128,M4$;:PRINT@P+160,M4$;:PRI
NT@P+192,M5$;
1010 IF X =2 THENPRINT@P,M$;:PRINT@P+32,
M2$;:PRINT@P+64,M4$;:PRINT@P+96,M4$;:PRI
NT@P+128,M4$;:PRINT@P+160,M2$;:PRINT@P+1
92,M5$;
1020 IF X=3THENPRINT@P,M$;:PRINT@P+32,M2
$;:PRINT@P+64,M4$;:PRINT@P+96,M2$;:PRINT
@P+128,M4$;:PRINT@P+160,M2$;:PRINT@P+192
,M5$;
1030 IF X=4 THEN PRINT@P,M$;:PRINT@P+32,
M3$;:PRINT@P+64,M4$;:PRINT@P+96,M4$;:PRI
NT@P+128,M4$;:PRINT@P+160,M3$;:PRINT@P+1
92,M5$;
1040 IF X=5 THEN PRINT@P,M$;:PRINT@P+32,
M3$;:PRINT@P+64,M4$;:PRINT@P+96,M2$;:PRI
NT@P+128,M4$;:PRINT@P+160,M3$;:PRINT@P+1
92,M5$;
1050 IF X=6 THENPRINT@P,M$;:PRINT@P+32,M
3$;:PRINT@P+64,M4$;:PRINT@P+96,M3$;:PRIN
T@P+128,M4$;:PRINT@P+160,M3$;:PRINT@P+19
2,M5$;
1060 IF X=7 THEN PRINT@P,M$;:PRINT@P+32,
M3$;:PRINT@P+64,M2$;:PRINT@P+96,M3$;:PRI
NT@P+128,M4$;:PRINT@P+160,M3$;:PRINT@P+1
92,M5$;
1070 IF X=8 THEN PRINT@P,M$;:PRINT@P+32,
M3$;:PRINT@P+64,M2$;:PRINT@P+96,M3$;:PRI
NT@P+128,M2$;:PRINT@P+160,M3$;:PRINT@P+1
92,M5$;
1080 IF X=9 THENPRINT@P,M$;:PRINT@P+32,M
3$;:PRINT@P+64,M3$;:PRINT@P+96,M2$;:PRIN
T@P+128,M3$;:PRINT@P+160,M3$;:PRINT@P+19
2,M5$;
1090 IF X=10THEN PRINT@P,M$;:PRINT@P+32,
M3$;:PRINT@P+64,CHR$(133)"***"CHR$(138);
:PRINT@P+96,M4$;:PRINT@P+128,CHR$(133)"*
**"CHR$(138);:PRINT@P+160,M3$;:PRINT@P+1
92,M5$;
1100 P=P+F
1110 RETURN
1120 CLS
1130 PRINT"YOU HAVE BROKEN THE BANK"
1140 GOTO1160
1150 PRINT"THE COMPUTER HAS WON THE GAME
"
1160 PRINT"IF YOU WANT ANOTHER GAME THEN
   PRESS Y IF NOT PRESS N"
1170 M$=INKEY$
1180 IF M$="Y"THEN RUN
1190 IF M$="N"THEN 1220
1200 GOTO1170
1210 PRINT
1220 PRINT"THANK YOU FOR PLAYING"
1230 END
```

Pontoon

Microradio

GW6JJN



Dragon RTTY

Regular readers of Microradio will remember my description of the RTTY system for the Dragon 32 which was in use at the Swansea Microshow a few weeks ago. Many people have asked me to let you know more about this excellent program. Well, here goes.

This program is called the G4BMK RTTY for the Dragon and TRS80 colour computers and is available from M J Kerry, 22 Grosvenor Road, Seaford, East Sussex BN25 2BS. Michael, who wrote the machine code program, tells me that it can be used without an interface on the Dragon and TRS80. A tone unit, or modem, will improve performance of course, but it is still an achievement to receive and send radio teletype (RTTY) purely with a software approach.

Since I have already described my experiences with the program in Microradio (*PCW* Vol 3 No 5) I will not repeat myself, but will tell you what you get for your money. Your own call sign is programmed in by the author and can be changed if necessary. The program will automatically synchronise to incoming tones. The baud rate is programmable, so that both amateur, commercial and weather stations can be decoded.

There is a 4000 character 'type ahead buffer' so that you can compose a reply in the bottom part of the split screen whilst receiving in the top part. Ten pages of text are supported and can be called at will by typing numbers 0 – 9. This facility means that information about the station, the weather, the computer and so on, can be written by the user before starting operations and then calling the pages when required. Several test phrases are held in the program, such as 'the quick brown fox' etc, and the software will also operate the 'push to talk' (PTT) line on the radio transmitter.

An 'Invert' command exists to reverse the mark and space parameters, and all conversations and information received by the user can be stored in memory, saved to tape or printed. Carriage return and other control characters are all automatic.

The cost of this fine program is £12 including post and packing for the cassette and £21 for the cartridge version.

The G4BMK program is complete, well written and reasonably priced. Anyone who is interested in transmitting or just receiving RTTY and who owns a Dragon 32/64 or TRS80 colour computer will find that this program will open up a completely new world on both the short wave and VHF bands.

Michael Kerry G4BMK who wrote this program is now working on a morse transceiver program, which he has promised to send in as soon as it is ready. Other plans include a Commodore 64 and Vic20 RTTY program as well as AMTOR for the Dragon and Tandy machines. If these programs are up to the standard of Michael's original, then he will have several winners on his hands. ■

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share, or topics that you would like to see covered, write to: Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

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Tony Bridge's Adventure Corner



Atmospheric

"As in a dream, you see yourself tumbling down a great, dark staircase. All about you are shadowy images of struggles against fierce opponents and diabolical traps. These give way to another round of images: of imposing stone figures, a cool, clear lake . . ."

What's this, the latest Quicksilva cassette inlay? The start of a new-look *Dallas*?

Thankfully, no, on both counts! It's the opening scene of *Zork III*, the final part of the great Adventure trilogy from Infocom. For my money (and you'll need quite a bit to be able to play them!), the Infocom programs are among the select few that manage to evoke a good sense of atmosphere, of "being there".

The other week, I quoted from a letter sent to me by Alan and Daphne Davis. Later in the same leter, they, to, mention "atmosphere' (and here they are talking of Adventures for the Spectrum).

"One thing that's rarely, if ever, mentioned in reviews is whether a particular program succeeds in creating a convincing world — atmosphere, if you like. This, of course, is where *The Hobbit* wins hands down over all the others. Both *Quest* (from Hewson), and *Knight's Quest* (from Phipps) create such an atmosphere quite well, whereas Artic's *Golden Apples* seem rather dead by comparison. One lacks a sense of purpose in such adventures. After all, it's not merely the intellectual problems of adventures that appeal — it's also the sensation of exploration. But the world does have to seem worth exploring, or we tend to lose interest."

Although the Davis's were speaking of Spectrum programs, there are, of course many other Adventures, for other machines. How do they figure in the "atmosphere" stakes?

At the start, I mentioned *Zork III*, and Infocom. Any of Infocom's Adventures can be relied upon to draw the player into a fantastic world, and hold his interest while there. The Zork Trilogy is easily the series that will be remembered above almost all other Adventures, maybe only excepting the orginal *Colossal Cave* that started the whole venture of Adventure.

None of the programs have any form of graphics, relying instead on the images conjured up by reams of text, an example of which I quoted at the start. Incidentally, this, the very start of *Zork III*, goes on for several more lines, and is quite typical, with most locations being given a screen and a half of descriptive text — even combat is gone into a great detail.

The total effect is like reading a novel, except that you, the reader/player, can actually influence the action and its outcome — it can be quite thrilling to watch. The other Infocoms, *Suspended, Planetfall, Enchanter* and so on, all follow the same pattern, although each one has a unique twist to give added interest. If you don't like all this text, you can ask the program to be brief, after which the program will just give an abbreviated description of each scene. They're very expensive, but very, very good. A couple of them, *Deadline* and *Witness*, include in the packaging several bits of paper (case dossiers, medical reports, suicide notes, matchbooks with scrawled 'phone numbers, news cuttings and so on), to heighten the realism, while *Planetfall* includes whimsical space postcards, Space Cadet's Manual, and more. *Deadline* and *Witness* are played in real time (or rather, computer time), all of which serves to increase the reality.

This side of the Atlantic, however, there are Adventure authors to be proud of, too. Level 9's Middle Earth Trilogy, although not having the luxury of random access that a disc affords, with all the memory that provides for adding detail, nevertheless manages to cram an awful lot of descriptive material into the text. Little touches throughout the games ensure that the feeling of "being there" is maintained throughout the series — in *Colossal Adventure*, for example, you will come upon a window through which you can glimpse a reflection of yourself, which waves back at you! You get no extra points for this, but it certainly adds to the atmosphere.

Lords of Times, the latest from Level 9, manages to take the player from the comfort of his own living room on a trip through no less than nine different worlds, each one lovingly created in text only, from a bleak sub-zero Ice Age to a warm and sleep English country garden (how do I get into the shed, someone?) Again, the feeling of actually walking through these segments of time is very strong.

Scott Adams Adventures, as you will know, have been the training ground for many an adventurer, and are held in great affection. The text is rather dry, and I find it hard to get personally involved in the adventure in the beginning sequences. Although, to my mind, they lack a little in atmospheric detail, in the Scott Adams series, the puzzle's the thing, and in this, they are magnificent!

You may not like text adventures that witter on and on like *Zork* — that sort of flowery prose may be too rich for some players, who want to get straight on with solving the puzzles of the adventure.

There are two ways in which the good author draws his "prey" (that's you, the player!) into his net. The obvious one, added graphics, we'll deal with next week. The second, not-so-obvious, way is seen working well in, for example, *Knight's Quest* as mentioned in the Davis' letter.

KQ starts off in a rather unpromising fashion, which, I have to admit, put me off on first contact. Almost non-existent descriptions (*"Courtyard. Sword."*), linked to extremely cartoonish illustrations, didn't do much to suspend my disbelief — but after a dozen or so locations, and several tough puzzles later, I found myself totally engrossed in the fantastic world of Mike Farley, the author. (As an aside, for anyone struggling in the early part of the adventure, here are a couple of tips. In a couple of weeks, I'll take a look at the later stages of this fascinating program, so let me know if you need a clue. For now, use the Adventure Corner substitution code: starting at the second letter, read every alternate letter until the end is reached, and then return to the first letter, repeating the process.

TFOE MEAD KTEH AEFD RRIA EGNO DN
and:
AIRN CTHH TEH C EALV EED★ GSEE

KQ is for the Spectrum, of course, but for other machines as well, there is a great series, of some 14 or 15 titles now, from Channel 8 Software. Regular readers will know that these are written by Brian Howarth, who has also undertaken the mammoth task of converting the Scott Adams adventures for the BBC and Spectrum (I can't wait to see them!). The Mysterious Adventures are similar to KQ in feel — short descriptions and rather unpromising starts. Though the creepiest of any start to any adventure is that of *Circus*. You are walking down a dark deserted country lane, having run out of petrol, when you see, in a field, a Circus. All the lights are burning, there is the sound of children laughing, animals roar . . . You push the gate open and all sound ceases! There is no one there! It's one of the best starts to an adventure that I've seen. Like KQ, the Mysterious Adventures soon pick up and, without realising it, you are sucked into an alternate reality.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

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PIRACY NOT OK

Craig R Adamson of Marwood Square, Stockton on Tees, Cleveland, writes:

Q Is it OK if I buy a program and transfer it to other tapes and then offer them for sale? I have lots of games and I've put the best ones on tape. Will I be able to sell these as well? None of them are of my own making.

A No! If you look back over the past year's issues of *PCW* you will see that software piracy is a highly emotive subject, yet still people ask me the same question. While I am the first to admit that the law is still hazy, there is a concerted push for stiffer penalties for piracy.

You are infringing copyright, and if you want to do this you must get permission in writing from the copyright holder. You are only allowed to make a back up copy for your own private use. That means what it says and is one copy only.

WHAT IS NODDY?

N. Haigney of Parkdale Road, Sheldon, Birmingham, writes:

Q I have just sold my TRS-80, and I'm hoping to buy a Spectrum, or a Memotech MTX-500. However I still possess my Tandy monitor, and wonder whether or not it can be used with one of the above computers. I have been told that I will need a de-modulator. Has the Memotech got sound and sprites? Who will be producing software for the computer in the future? Has it got CP/M, and what is Noddy?

A The Tandy monitor has a composite video input, 2v, peak to peak, so any composite video input will work. Though in the Tandy this is at 2v peak to peak, it would be quite possible to use the monitor on the Memotech and the Sinclair, and no extra hardware should be necessary.

It is always hard to guess who will be producing software for any computer that is still quite new. The Memotech has good sound and sprites. Noddy is like a mini second language that is available on the Memotech and that can be used and accessed direct from Basic. Essentially it is a text, and format handling language. The machine could be CP/M compatible, but as far as I know this potential has not yet been realised, and no package is available.

BUILD YOUR OWN COMPUTER

N Hamer of St Andrews Road, Spenny Moor, Co Durham, writes:

Q I already have a Spectrum and a ZX81, but I would like to build a computer of my own. I have only seen one book on the subject, and that was quite old, and had out of date components in it. Can you tell me if there are any modern books for building a computer, and if so, where they can be obtained.

A The only book I have seen on this subject is quite good but will demand a lot of time, if you are to see the project through to the end. Luckily, it is written around the Z80 microprocessor, which of course you have already had experience of in the two Sinclair computers.

The book is *Build Your Own Z80 Computer* it is written by Steve Ciarcia. The publisher is Byte books, which is part of Mcgraw-Hill. The ISBN is 007-01-09621. It is not a slavish 'do this' approach, instead it leaves some room for your own development.

DRAGON 32 — OR 64?

Jason Kelly of Godmanchester, writes:

Q With presents and things I have now saved and got enough money to buy a Dragon 32, which is the computer most of my friends have got. Now I see that there is a Dragon 64. Is this better? What are the differences, do you think I should save some more to buy this computer instead?

A Personal opinions always come into questions like this — when one computer is compared to another. In this case, it really depends on what you want your computer for. Essentially the Dragon 64 is just a Dragon 32 with some extra memory and one or two other things, most notably a RS232 interface, tacked on.

The disadvantages of the system are that it still has the same display with a lack of readily available lower case characters, and that the extra memory overides the cartridge port — or rather the Basic does. This of course, creates problems when more serious packages such as a spread sheet or word processor are considered.

The advantages are that the RS232 allows more communication, and longer programs can be *Run* and that the 64 is fully compatible with the 32. In fact, when you switch on, you in effect have a 32. The keyboard response has been sharpened, and some of the bugs have been taken out of the *Rom* to leave an efficient and good quality Basic. And, of course, you can now link it with disc drives.

ONE TRACK MIND

Mr S Ålg of Wandsworth Bridge Road, Fulham, London SW6, writes:

Q Could you please tell me the differences between a 40 track, and an 80 track disc drive? That is, what can you do with an 80 track, that you cannot do with a 40 track?

A More often than not you are talking about single density (40 track) and double density (80 track) disc drives. While the actual storage capacity depends on the formatting of the disc, it is actually possible, but unlikely, to have a single density drive store more when used with a particular computer system, than the same size disc at double density, on another computer.

The reason stems from the way information is stored on a disc. Usually it is in forty concentric circles, called tracks, each track being divided into many segments. A segment might typically be 128 or 256 bytes big. Clearly it is easier to get 40 tracks onto a disc than 80. Because of this the quality of a double density disc has to be much better for it to be of use.

TYPEWRITER LINK UP

Mr T Webb of Wordsworth Avenue, Newport Pagnell, Bucks, writes:

Q As the father of a new Spectrum owner, and with a wife who owns a silver Reed electric typewriter, 2600C model SP 8700, I was most interested to read the letter from Lance Walton printed in your 22nd December issue. Could you tell me if it is at all possible that my wife's typewriter could be linked to my son's 48K Spectrum as a printer?

A I'm afraid not. The 2600C model is a straightforward electro-mechanical portable with no expansion facilities. To quote Silver Reed, "There's not a chip in sight."

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW,* 12-13 Little Newport Street, London WC2R 3LD.

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VIC 20 C&N cassette, 2 cardriges. All Imagine s/w. Slap Dabs, Space Attack, Wizard & Princess and more. Worth £220 + £100 mags. Also assorted s/w £150. Tel: Canvey Island 692307.
CBM 64 + Disc, asembly, host of games, books £350. Write to Sean Hayes, Room 15, Great Kraywood, SE18.
VIC 20 + 2 cartridges and joystick +

cassette games and mags. As new. £90. Tel: 01-689 9679 after 5pm.

VIC 20 S/W FOR SALE. All original inc: Matrixz, Arcadia. Tel: Harlow (0279) 37629.

VIC 20 WITH CASSETTE. 3K Super Expander, 16K Expansion, 2 cartridges (games). £150. Mike 01-701 4115.

COMMODORE 3022 PET Tractor feed printer, 1EE 488 input, £120. Tel: Aberdeen (0224) 821528.

COMMODORE PET. Basic 2 utilities, less than half price. Toolkit £10. Superchip £12. Arrow/pagewriter £28. Simplicalc (tape) £10. Phone 01-579 6252 after 6pm.

THE COUNT, VIC 20 Adventure cardridge for sale or will swap for 3K or 8K Ram on super expander. Tel: Rob (Harrogate) 0423 866266 after 4pm.

VIC 20 & CN2 32K Swishale Ram pack intro to Basic 1&2 Tomb of Drewam and Mok Pharohs Tomb free Adventure cartridges Dust Cover £180. Tel: Romford 46719 evenings.

VIV 20 & Accessories and s/w ring for details (0438) 314086.

VIC 20 & 8K Ram, m/c monitor, 1 games cartridge & lots s/w. £100. Tel: 021-704 2038.

VIC 20 & C2N, Instructions to Basic & 4 games. !90 2 months old as new. Tel: 01 205 7948.

VIC 20 & C2N cassette unit, joy stick, s/w, mags and books. Sell for £110 or swap for 48K spectrum with s/w. Tel: Kiran 01-572 6725.

COMMODORE 64, C2N cassette, s/w inc: Munhcman, Hobbit & Books. £220 ono. Tel: 01-341 4902.

COMMODORE 64 3 months old. 5 yr guarantee, cassette recorder s/2 e.g. Hobbit £350. Trehams 410500.

32K VIC 20 (switchable) & 9 top games & Books & Cassette Deck & Joystick & Mags, all cost over £300. Much better value than the starter pack at £170.95. Telephone Steve on Coventry 418809 after 5.00pm.

COMMODORE 64 & 1541 Disk Drive & Easy script, & games & books, manuals, & macro-assembler development system and 22 data life disks, 3 months old, worth £480. Sell for £390 all still under guarantee. Phone (Oxford) 54084.

Ataris for sale

BRAND NEW ATARI VCS, with Pitfall and Combat, total £95 ono. Chesham 785285.

ATARI 400 48K, including manuals, programme recorder, joysticks, £60 of software, worth £300, will sell £160. Tel: (0625)27305.

ATARIC VCS plus joysticks, paddles and 7 cartridges, Combat, Space Invaders, Asteroids, Missile Command, Night Driver, Street Racer and Air/Sea Battle. All perfect condition, £70 ono. Tel: Derby (0332) 512043, after 6pm.

ATARI 800 48K with cassette recorder, 6 cartridges, inc Pole Position, 7 cassettes inc Blue Max, also joystick, approx £710, sell for £400. Torquay 22058.

ATARI VCS, as new, with Pac Man, £55, or swap for 48K Spectrum with £15. No S/W or tape recorder needed, only manuals and lead required. Tel: 0738 24823 Perth.

ATARI VCS, excellent condition, 5 cartridges inc, Space Invaders, Astroids, Super Break-out, cost £180, accept £90. Brentwood 223817, eves.

ATARI CASSETTE Enhancer + Magic Window. Mint condition £10 for both. Will not split. (Not XL) phone Paul 021 422 4167 after 8pm.

ATARI 800 (48K) (inc new 1050 disc drive 1010 cassette deck and 850-RS 232, Paralell Printer interface. (Epsom cable), Microsoft Basic, Atari Writer, Action all Rom version and assorted games. £550. Tel: Slough 71392.

ATARI VCS + 11 cartridges worth over £400, will accept £175 ono. Phone Wickford 67335.

ATARI 400/800 Zaxxon Zeppelin, Blue Max, Astro Chase, Combat Leader, Submarine Commander £12 each. Program Recorder £20. 01-997 1906.

ATARI VSC with seven cartridges, Sky Diver, Bowling, Street Racer, Maze Craze, Video Olympic, Code Breaker with touchpads, joystick and paddles £65. Tel: 0255 820685.

ATARI 48K 400/800 wanted also 810 disc drive. Tel: 021 554 2992 (Chris).

ATARI ROMS, Star Raiders, Mountain King, River Rescue. Cass 16K controller, OK Gaxley, Nukwar Roms £15 each cassette. £10 each or will swap for Atari 850 or Modem or why Kim after 6pm 0268 558037.

ATARI VLS CONSUL, 4 cartridge, games holder £55. Tel: 0865 340 667.

ATARI VLS with 15 cartridges including Vanguard, PacMan, £150 ono. Tel: 01-963 4238 evenings only.

ATARI 800 + 48K + Disc Drive and cassette unit plus £350 of games inc. Ford Apocalypse, Septir, Defender, Donkey Kong, Minor 204ER, Mr Robert, Dragontye. £400. Tel: Ascot 21160.

ATARI VC5 9 cartridges frogger, asteroids, defender, star randlers, £110 microdrive order form — highest offer Tel: 755 474 (Romford).

ORIGINAL SOFTWARE for Atari 400/800, Choplifter disk £15. Gomoku disk £6. SYN Assembler disk £29. Fastgammon cassette £5. Le Stick joystick £8. Tel: Chelmsford (0245) 269030.

ATARI UCS cartridges for sale, Jungle Hunt, Raider of The Lost Arc, £15 each or £40 the lot. Ring Julie :0908) 662826 after 5pm.

ATARI VC8 Good conditions & 2 cartridges £50.00 Tel: 01 341 4894.

ATARI 810 disk drive as new in box 6 weeks old £1300 of s/w Inc. disk drive Bargain at £300. No offers. Tel; Glossap (455) 5408.

ATAM VCS 6 cartridges, £80. Tel Grays Thurroch 70623, after 6pm.

ATARI VCS. Six Cartridges, Space Invaders, Missile Command, Combat, Adventure Night Driver, Street Racer, extra paddles, V.G.C. £120 Jupiter Ace, 16K Ram Pack, Four Tapes £50 Tel: 794 7759 evenings.

ATARI 800 48K basic cartridge cassette recorder de-re Atari and original manuals three joysticks two paddles six cartrides eight games cassettes and four language courses. Worth £900 offers around £600. (0256) 23199 (Basingstoke).

ATARI 800 16K Ram packs for sale £30 each. Also MX80 or FX80 printer wanted. Tel: Coventry 0203/70932 (eves).

ATARI 400 16K, with basic cartridges, joysticks, two months old £150 Monday to Friday 4pm onwards. Tel: 061 336 7115.

For sale

ZX PRINTER £25 ono Tel: 0705 4753351.

CASIO FX802ZP. Pocket Computer/Scientific Calculator + FA3 cassette interface, built in printer, programmable to 1568 steps. Manual, etc. Worth £115. Perfect condition, 2 months old, just £85. Phone 0422 75366. Patrick.

CARTRIDGES for sale! All at el cheapo prices! All perfect condition. All for ze vic=20. Only £7 each! (inc. road race, pirate's cove, avenger, voodoo castle) Tel: 0743 60890 (Michael).

SNUGART 100K drive for BBC with 40 diseg (cost appox. £290) sell £225 ono. or might split. Ring: 01-572 2917.

ORIC-1 for sale. Only £75. Cassette and accessories included still under guarantee. Tel: Crawley 518460. Weekends and after 6pm weekdays only.

ZX PRINTER paper. Sinclair origin in original wrapper. Ten rolls available will split. Ring Derek on Ware (0920) 2592 evenings.

KEMPSTON INTERFACE + 3 conversion tapes £20, 3D combat zone £3, Zip Zap, Aquarus. £2. Ask for Gareth after 6.30pm 01-393 3909.

FED UP paying £5 for one game? Three excellent spectrum games, force, town, snake for £2. Send cheque P.O. payable to Monksoft Highlands, Blue Boys Park, Minchinhampton, Stroud, Glos, GL69JT.

ZX MICRODRIVE + Interface I £99. Tel: 0625 877496.

MICROTON 65 singleboard with unexpanded expansion + P.S.U. £40 or offer. Tel: (Slough) 0753 493 42.

PRISON VTX 500. Prestal/micronet adaptor for spectrum unused (unwanted gift) £90 ono. Tel: 01-367 (1) 2923 eves or weekends.

SALE OR SWAP T199/4A + joystick and one cartridge (Music Maker) for £110 ono or swap for Spectrum. Tel: Alex (0603) 665469.

LYNX SOFTWARE. Gempack 3/4, Sultans Maze, Oh Mummy, Spanner Man, Grid Attack, all, £4 each. Colossal Adventure, Adventure Quest, £5 each or £30 the lot. Ring Stafford (0785) 661745 after 5pm.

THE ORD, do not pass go. Soft talk II, softex compilex, Sinclair: road to Road No I, club recorder file, Astroids. All for sale at half price or consider swap for other games. Also 12 Philips 1700 video cassetts. Tel: 01 546 8738.

New Releases

BLACKSTAR

Castle Blackstar looks like generating enough questions to keep Tony Bridge employed for another year, at least. It is a machine code program for the 48K Spectrum that should have the hardened addicts rubbing their hands with glee.

Text only — you are set the quest of recovering a magic orb and bringing it back to the mysterious Lady Artemis.

The program has a vocabulary of over 200 words and can understand complex instructions like "Take Lamp and Light it". A quick glance suggests that it's a cut above the usual standards and could well become a classic.

The company plans to issue versions of the game for the Dragon 64, Commodore 64, and Apple II in the near future. The program is the first in a planned series of related adventures from the company.

Program *Castle Blackstar*
Price *£8.95*
Micro *Spectrum 48K*
Supplier *SCR Adventures, 190 Shelbourne Road, Tottenham, London N17*

SNOWMAN

A good many of us may have had our post Christmas depression relieved by the showing of *The Snowman* — a cartoon adaptation of Raymond Brigg's magical book.

Now you can play the computer game of the cartoon. *The Snowman* captures the gentle spirit of the original book and manages to produce an exciting game without a trace of violence.

The screen layout is a little like *Burger Time* — you must move a little boy along ledges and up ladders collecting the snow with which to build the snowman.

Once built, he must be dressed with scarf, nose, buttons, eyes and, most important of all, his smile. Later screens have you collecting toys and ice.

The task is impeded by flames that dart around melting the snow you are collecting — forcing you to go back and get some more. There are also some sleep monsters who can be frightened off by an alarm clock.

The worst thing that can happen in this game is that the little boy uses up his four goes and slips back into bed. Wholly admirable and beautifully designed.

Program *The Snowman*
Price *£6.95*
Micro *Spectrum 48K*
Supplier *Quicksilva, 13 Palmerston Road, Southampton, Hampshire, SO1 1LL*

BLACK HOLE

For lovers of the miniscule detail and complex strategies that go to make up wargames, *Galaxy Adventure* could be just the thing. It's an epic, real time, space adventure game with your Spectrum controlling the moves.

Playing the game is not a matter of fast reactions but of careful planning and judgement — what weapons should you use? How much defence power is necessary?

There are all kinds of other features in the Universe including meteor storms and black holes which all pose their own unique threats. The game comes with an extensive manual and retails for an unprecedented £2.75. Highly recommended.

Program *Galaxy Adventure*
Price *£2.75*
Micro *Spectrum 48K*
Supplier *Alpha Software, Old Elms, Rectory Walk, Gamston Retford, Notts DN22 0QE*

3K GAMES

As a masterpiece of condensed programming apart from anything else *Games Designer* from Galactic Software deserves a mention — it gives you the ability to create games to (within limits) your own specification on an unexpanded Vic 20 ie, in 3K.

Although you are basically restricted to 'get past the aliens' type games, the program has a remarkable number of features. You can design your own characters and sound effects, as well as controlling things like where the player starts on screen and where he has to get to.



The instructions are brief but simple and the cassette comes with three games for you to start with. All are reasonably fun to play.

Program *Games Designer*
Price *£9.50*
Micro *Vic 20*
Supplier *Galactic Software, Unit 7, Larchfield Estate, Dawlish Ford, Somerset*

CONVEYOR BELT TO OBLIVION

Having said some unkind things about Virgin's games in the past, it's nice to be able to say that *Them* for the Oric 1 is a vast improvement on their usual standard.

It's a five part arcade style game requiring both dexterity and logic. Each section is quite different from the last and all are written in machine code.

The first section involves avoiding various bouncing aliens as you make your way to an exit — later sections involve building towers out of blocks and stopping a conveyor belt that is taking you to oblivion. The game also includes a special practice mode in which you can try all the screens.

Program *Them*
Price *£5.95*
Micro *Oric 1*
Supplier *Virgin Games, 61-63 Portobello Road, London W11 3DD*



THE STING

Arcade thrills for bee keepers everywhere. *Sting 64* is an arcade style game in which the plot is heavily bee orientated.

In the first screen you defend a garden of hives using your bee swarm, then you chase off some raiders and finally defend the queen bee.

It's fairly straight forward, break the joystick stuff, but this being a Commodore 64 program the graphics are excellent and the game is fairly addictive.

Program *Sting 64*
Price *£7.95*
Micro *Commodore 64*
Supplier *Quicksilva, 13 Palmerston Rd, Southampton, SO1 1LL*

DON'T PANIC

Unlike the Spectrum, the Oric is not plagued by four hundred versions of *Apple Panic* — there may just be a dozen or so.

Digger is the latest version and, unlike some of the others, is all machine code. It is also

(doubtless for sensible reasons) *Saved* at 300 baud. This means that if you think you might fancy a quick game in the morning before you go off to school, you'd better load it up the previous night — it takes a long time.

The game itself involves a network of ladders and platforms about which are scattered a number of bundles of treasure. The levels are patrolled by some nasty monsters whom you can only defeat by digging a hole and luring them into it. As good a version as any.

Program *Digger*
Price *£6.95*
Micro *Oric 1*
Supplier *Mercury Microware*
1 Duxford Walk
Moston
Manchester 10
M10 9JN



DR FRANKY AND THE MONSTER

Virgin Games has just issued the latest in its — seemingly monthly — batches of new software.

Dr Franky and the Monster is for the 48K Spectrum and is roughly (very) *Manic Miner* in form. There are nine screens, each laid out slightly differently — there are several objects which you must collect and then take to your monster which will flicker into life.

Like *Miner*, the controls are simple — left, right and jump.

Reviving the monster is made difficult by various strange square shaped objects that block your path.

The graphics are large, although a bit flickery, but other than that the game hasn't much to distinguish it.

Program *Doctor Franky and the Monster*
Price *£5.95*
Micro *Spectrum 48K*
Supplier *Virgin Games*
61-63 Portobello Road
London W11 3DD



CRYSTAL CLEAR

Doubtless the more mystical among you will be familiar with the poetic prophecies of Nostradamus where the secrets of the future were revealed in the form of four line quatrains.

Of course the great alchemist himself (Nos to his friends) constructed the quatrains after long hours of meditation dwelling on the secrets of the Universe.

For those of us who don't seem to find the time to dwell on secrets the way we would like to, a new program called *Crystal* allows your BBC B to do it for you.

The program uses various randomising processes and a data base of suitable words and phrases to enable your BBC B to produce Nostradamas style quatrains — all about as convincing as the originals.

Program *Crystal*
Price *£3.45*
Micro *BBC B*
Supplier *Scientific Software*
Old Loom House
Back Church Lane
London E1 1LS

INSIDE STORY

Islets of Langerhans is a text adventure where the setting is not middle earth, but the even more mysterious region of inner space (as it used to be called in the sixties) ie the human body.

Your task is to travel through a human body and find the islets — then you have to find your way out again. If it sounds familiar then you've probably seen the film called *Fantastic Voyage* in which Raquel Welch played a female scientist who was minaturised and injected into somebody's blood stream.

Back to the adventure — it's all machine code and is text only. The kinds of baddies you'll find in the game include enzymes and bacteria rather than goblins and elves. I am almost certain there is not one magic ring anywhere to be found.

Program *Islets of Langerhans*
Price *£4.00*
Micro *Spectrum 48K*
Supplier *Amazing Games*
39 Maple Drive
Burgess Hill
West Sussex
RH15 8EX

YORKIE

Delivery is an interesting sounding game which combines a mixture of arcade and tactical styles.

Your task is to deliver various goods to different locations which are linked by a road network constructed by the computer.

Your journey is made difficult by a series of dead ends, one ways, speed restrictions and other road hazards. You are also burdened with a co-driver who will abuse you from time to time and a back door on the van that occasionally flings open, making it possible for you to lose your load.

Successful delivery of loads and avoidance of fines, etc. earns you money — earn enough and you are given a holiday. Earn under £10 and you are fired. Life under capitalism eh?

Program *Delivery*
Price *£7.50*
Micro *BBC B*
Supplier *Paean Systems*
Little Bealings
Woodbridge
Suffolk IP13 6LT

ARTIC ROLL

Pengwyn is an arcade game set in some Arctic wastes where you, not unexpectedly perhaps, are a penguin.

However, being a penguin does not materially affect the plot in any way which involves moving some flashing blocks into a straight line.

This simple sounding task is made difficult because you must find your way around various chunks of ice which are blocking your path. The time spent avoiding or melting the ice enables various 'nasties' to pursue you. You must avoid them — your score on each screen depends on how quickly you can complete the task.

Program *Pengwyn*
Price *£6.95*
Micro *BBC B/Electron*
Supplier *Postern Limited*
PO Box 2
Andoversford
Cheltenham
Glos GL54 5SW



New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, WC2R 3LD.

Top 10

Atari
1 (-) Rally Speedway (Adventure International)★
2 (-) Zaxxon (Datasoft)
3 (8) Enchanter (Infocam)†
4 (-) Saga 4 Voodoo Castle (Adventure International)
5 (9) Caverns of Kafka (Cosmi)
6 (5) Warlock (Calisto)†
7 (-) Arrow of Death Part 2 (Channel 8)
8 (-) Zork I (Infocom)†
9 (-) Savage Pond (Starcade)
10 (4) Astro Chase (Parker Chase)★
★ Cartridge †32K Cassette or disc
(Figures compiled by Calisto Computers, Birmingham 021 632 6458)

BBC★
1 (2) Planetoids (Aconsoft)
2 (-) Arcadians (Acornsoft)
3 (9) Snapper (Acornsoft)
4 (1) Rocket Raid (Acornsoft)
5 (3) White Knight Mk2 (BBC)
6 (-) Missile Base Acornsoft
7 (-) Killer Gorilla Program Power
8 (-) Starship Command (Acornsoft)
9 (6) Meteors (Acornsoft)
10 (7) Missile Control Gemini
★ All Model B.
(Figures compiled by Micro Management, Ipswich 0473 59181

Spectrum
1 (1) Atic Atac (Ultimate)★
2 (5) Chequered Flag (Psion)★
3 (4) Manic Miner (Bug-Byte)★
4 (2) Lunar Jetman (Ultimate)★
5 (10) Flight Simulation (Psion)★
6 (9) 3D Ant Attack (Quicksilva)★
7 (3) Stonkers (Imagine)★
8 (-) Kong (Ocean)★
9 (-) Jet Pac (Ultimate)
10(-) The Alchemist (Imagine)★
★ Requires 48K.
(Figures compiled by W H Smith and Son, London)

VIC 20
1 (–) Megagalactic Llamas battle at the edge of time (Llamasoft)
2 (1) Wizard and the Princess (Melbourne House)
3 (1) Wacky Waiters (Imagine)
4 (4) Gold Runner (Llamasoft)
5 (3) Snooker (Visions)
6 (6) Bewitched (Imagine)
7 (7) Catcha Snatcha (Imagine)
8 (9) Arcadia (Imagine)
9 (–) Sky Hawk (Quicksilva)
10 (8) Abductor (Llamasoft)
(Figures compiled by Boots/Websters)

COMMODORE 64
1 (–) Revenge of the Mutant Camels (Llamasoft)
2 (–) Mister Wimpy (Ocean)
3 (3) Crazy Kong (Interceptor Micros)
4 (–) Manic Miner (Software Projects)
5 (–) Hunchback (Ocean)
6 (1) Space Shuttle (Microdeal)
7 (2) Falcon Patrol (Virgin)
8 (–) Grandmaster Chess (Audiogenic)
9 (7) Motor Mania (Audiogenic)
10 (9) Ship of the Line (Richard Shepherd Software)
Figures compiled by Boots/Websters

DRAGON 32
1 (1) The King (Microdeal)
2 (2) Eightball (Microdeal)
3 (3) Skramble (Microdeal)
4 (4) Leggit (Imagine)
5 (8) Transylvanian Tower (Richard Shepherd Software)
6 (7) Dragon Chess (Oasis)
7 (5) Grand Prix (Salamander)
8 (–) Cuthbert in the Jungle (Microdeal)
9 (–) Devil Assault (Microdeal)
10 (–) King of Darkness (Wintersoft)
Figures compiled by Boots/Websters

ZX81
1 (1) Football Manager (Addictive Games)
2 (3) Flight Simulator (Psion)
3 (2) Astroids (Quicksilva)
4 (9) Krazy Kong (PSS)
7 (5) Invaders (Quicksilva)
6 (5) Space Raiders (Psion)
7 (4) Mother Ship (Softsync)
8 (8) Defender (Quicksilva)
9 (–) Hopper (PSS)
10 (–) Espionage I (Artic)
Figures compiled by Boots/Websters

Books
1 (-) Winning Games on the Commodore 64, *Barratt* (Horwood)
2 (5) Advanced User Guide for the BBC Micro, *Bray* (Cambridge Micro Centre)
3 (-) Using the 64, *Gerrard* (Duckworth)
4 (2) Mastering Machine-code on Your ZX Spectrum, *Baker* (Interface)
5 (-) BBC Micro Compendium, *Rushton* (Interface)
6 (-) Advanced Programming Techniques for the BBC Micro, *McGreggor and Watt* (Addison-Wesley)
7 (-) Build Your Own Expert System, *Naylor* (Sigma)
8 (-) Starting Forth, *Brodie* (Prentice Hall)
9 (8) Commodore 64 Programmer's Reference Guide, *Commodore* (Commodore)
10 (10) 68000 Assembly Language Programming, *Kane and Leventhal* (Osborne)
(Figures compiled by Watford Technical Books, Watford 0923 23324 Prestel 28844)
(Last week's position in brackets)

Book Ends

VOLUMINOUS

Someone should tell Ian Sinclair to take a holiday — he seems to spend every waking moment writing books on every micro under the sun.

Latest product of his voluminous output is *Electron Machine Code for Beginners.*

Ninety-nine per cent of all machine code books are exactly the same in format — it goes something like this: Machine code and why it's wonderful, central processor, Hex/Dec,



Ins and Outs, Stacks and Relative jumps, etc., etc.

Ian Sinclair's book adopts roughly this format but, partly because he writes clearly and concisely and partly because the Electron has a built-in Assembler, he manages to go more deeply into the subject.

Book	*Electron Machine Code for Beginners*
Price	*£6.95*
Micro	*Electron*
Supplier	*Granada Publishing 8 Grafton Street London W1X 3LA*

WINNING

Winning Games on the Commodore 64 is not actually about winning games on the Commodore 64 at all — the slightly misleading title means, I think, winning in the sense of 'winning smile'.

In fact, though, the book is excellent. The first section covers basic games writing information like sprites, sound and joystick control. The book ends with a series of programs, most of which are of high quality.

Book	*Winning Games on the Commodore 64*
Price	*£5.95*
Micro	*Commodore 64*
Supplier	*Ellis Horwood Cooper Street Chichester Sussex*

This Week

Program	Type	Micro	Price	Supplier
'O' Level Geography	Ed	Dragon 32	**£6.50**	Abacus
100 Programs	Arc	Spectrum	**£11.50**	Prentice Hall
1994	Ad	Spectrum	**£6.95**	Vision
Armageaddon	Arc	Commodore 64	**£9.95**	Vision
Artist	Ut	Dragon 32	**£5.00**	Abacus
Author	Ut	Oric	**£14.50**	Tansoft
Aztec Challenge	Arc	Commodore 64	**£12.95**	Audiogenic
Banana Drama	Arc	Commodore 64	**£9.95**	Vision
Bongo	Arc	Commodore 64	**£7.95**	Anirog
Boogie & Classics I	S	BBC	**£4.95**	Broadway
Boogie & Classics II	S	BBC	**£4.95**	Broadway
Cosmic Command	Arc	Commodore 64	**£5.95**	Anirog
Cybotron	Arc	Commodore 64	£7.95	Anirog
D Bug	Ut	BBC	**£7.95**	Enigma
Defenda	Arc	Spectrum	**£5.50**	Interstella
Diamond Quest	Ad	Spectrum	**£6.00**	CCS
Eagle	Arc	BBC B	**£7.95**	BBC
Editor Assembler	Ut	Commodore 64	**£18.50**	Duckworth
Espionage Island	Ad	Commodore 64	**£6.95**	Artic
Exploring Adventures	Ad	Spectrum	**£7.95**	Duckworth
Extended Basic	Ut	Commodore 64	**£18.50**	Duckworth
Forbidden Forest	Arc	Commodore 64	**£12.95**	Audiogenic
Frantic Freddie	Arc	Commodore 64	**£12.95**	Audiogenic
Golden Apple	Ad	Commodore 64	**£6.95**	Artic
Gusher	Arc	Commodore 64	**£9.95**	Vision
Hurg	Ut	Spectrum 48K	**£14.95**	Melbourne House
Inca Curse	Ad	Commodore 64	**£6.95**	Artic
Indian Attack	Arc	Commodore 64	**£5.95**	Anirog
Island Adventure	Ad	Commodore 64	**£7.95**	Duckworth
Italian	Ed	Oric	**£12.95**	Tansoft
Jungle Drums	Arc	Commodore 64	**£7.95**	Anirog
Klartz & the Dark	Ad	Dragon 32	**£9.95**	Dragon Dungeon
Klartz & the Dark	Ad	Commodore 64	**£9.95**	Dragon Dungeon
Krakatoa	Arc	Spectrum	**£5.95**	Abbex
Marooned	Ad	Vic 20	**£4.50**	Buntasoft
Measuring Instruments	Ed	Dragon 32	**£6.50**	Abacus
Metrical	Ut	Dragon 32	**£5.00**	Abacus
Moon Buggy	Arc	Spectrum	**£6.95**	Visions
Music Tutor	Ed	Dragon 32	**£9.95**	Abacus
Optics	Ed	BBC	**£9.99**	Compusoft
Paratroopers	Arc	Commodore 64	**£5.99**	Rabbit
Pedro	Arc	Spectrum	**£5.50**	Imagine
Pegasis	Arc	Commodore 64	**£12.95**	Audiogenic
Planet of Death	Ad	Commodore 64	**£6.95**	Artic
Ship of Doom	Ad	Commodore 64	**£6.95**	Artic
Slinky	Arc	Commodore 64	**£12.95**	Audiogenic
Space Pilot	Arc	Commodore 64	**£7.95**	Anirog
Star Base Defence	Arc	Commodore 64	**£5.95**	Anirog
Star Doodle II	Ut	Dragon	**£9.95**	Gough
Ten Little Indians	Ad	Spectrum	**£6.95**	Digital Fantasia
Ultimon	Ut	Spectrum	**£5.95**	Microholics
Zodiac	Ad	Commodore 64	**£7.95**	Anirog

Key: Ad — adventure/**Arc** — arcade/**Ed** — education/ **S** — strategy-simulation/**Ut** — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.



Creative pastimes

One of the most pointless pursuits known to humans must be chess. What a waste of time.

You spend all that time to no productive purpose, for what good does it do? What does chess playing do that is at all useful? About all that can be said in favour of playing chess is that it keeps the manufacturers of chessmen, the writers and publishers of chess books, and similar leeches, gainfully occupied.

Another similarly wasteful and pointless activity is that of painting, because paintings neither keep the rain from one's head nor can they be eaten for sustenance. The only useful aspect is that paintings can cover the mould on the wall.

We, as a nation, support wasters in higher education who take pointless degrees in subjects such as English Literature, Drama, or (how pointless can you get?) Philosophy. What good are graduates in these disciplines, because they only lengthen the dole queues? We would not have as many problems as a nation as we do, if we had not allowed so many youngsters to become sociologists.

All we need to solve Britain's (and the world's?) problems is to produce people with practical skills, and — as we all know — home computers are immensely impractical devices. All one can do with home computers (without vast extra expense) is zap aliens, delve into dungeons, and that's about it — home computers, like chess or painting, are pointless pursuits.

Only one word can summarize the foregoing. The word is RUBBISH. (There is, I suppose, perhaps more than one word).

Chess, painting, computers, degrees in English, Drama, Philosophy, and Sociology, are all subjects or pastimes which allow the individual person to become a creative individual. The true point to chess is that it is of no practical applicability, but the mental exercise involved in coming to terms with the game is truly beneficial, and so with the others.

Creativity is allowed, is encouraged, but does not come unless the individual is ready to welcome the opportunity. The list of similar subjects is quite long, and includes most subjects at present unpopular with the narrow minded promoters of 'practical' subjects.

To have a computer at home does not mean that the individual therefore becomes a creative individual. Two extreme (and mindlessly uncreative) responses are either, one, to sacrifice one's life to games or, two, to dislike games and believe that is all there is to computing. Both these fanatics have entered an uncreative mindless world.

If one's knowledge of Basic does not extend beyond the fever to type in more games (and never write a game for oneself), or one's conception of computers does not extend beyond a mundane desire that computers be 'practical', by sympathies. Computers are one of the ways in which the creative person can exercise creativity.

The initial excitement of a person owning or using a computer soon wears off, and if that excitement did not wear off then one would suspect the person's complement of grey cells. The question is "What next?"

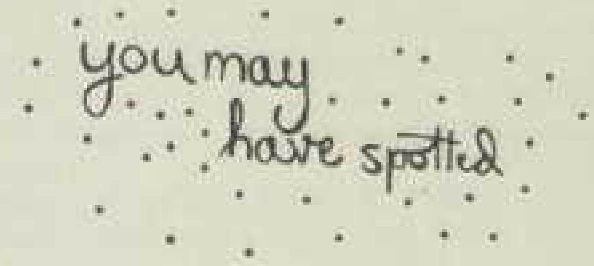
To the mundane, the answer is "Nothing practical"; to the creative, the answer is "Who knows? One can only try". ■

Boris Allan

Spoted numbers

Puzzle No 95

Look at this series of numbers: 16, 25, 36, 49, 169, 256, 289, . . .



You may have spotted that each of these numbers is a perfect square, but can you see any other property common to them all?

The next number in the series is 1369, the square of thirty-seven, and the important point is that each of these numbers has its digits arranged in ascending order, the numbers listed being the eight lowest possible.

What is the highest perfect square in which the digits are all in ascending order?

Solution to Puzzle No 90

The first part of the problem involves finding a right-angled triangle in which one of the non-hypotenuse sides is 47 units, and the other two sides are an exact number of units in length.

Once this is found, the bearing can be found by calculating the inverse cosine of 47 divided by the length of the hypotenuse. Many micros calculate in *radians* rather than degrees, so the value should be converted if this is the case (Line 130).

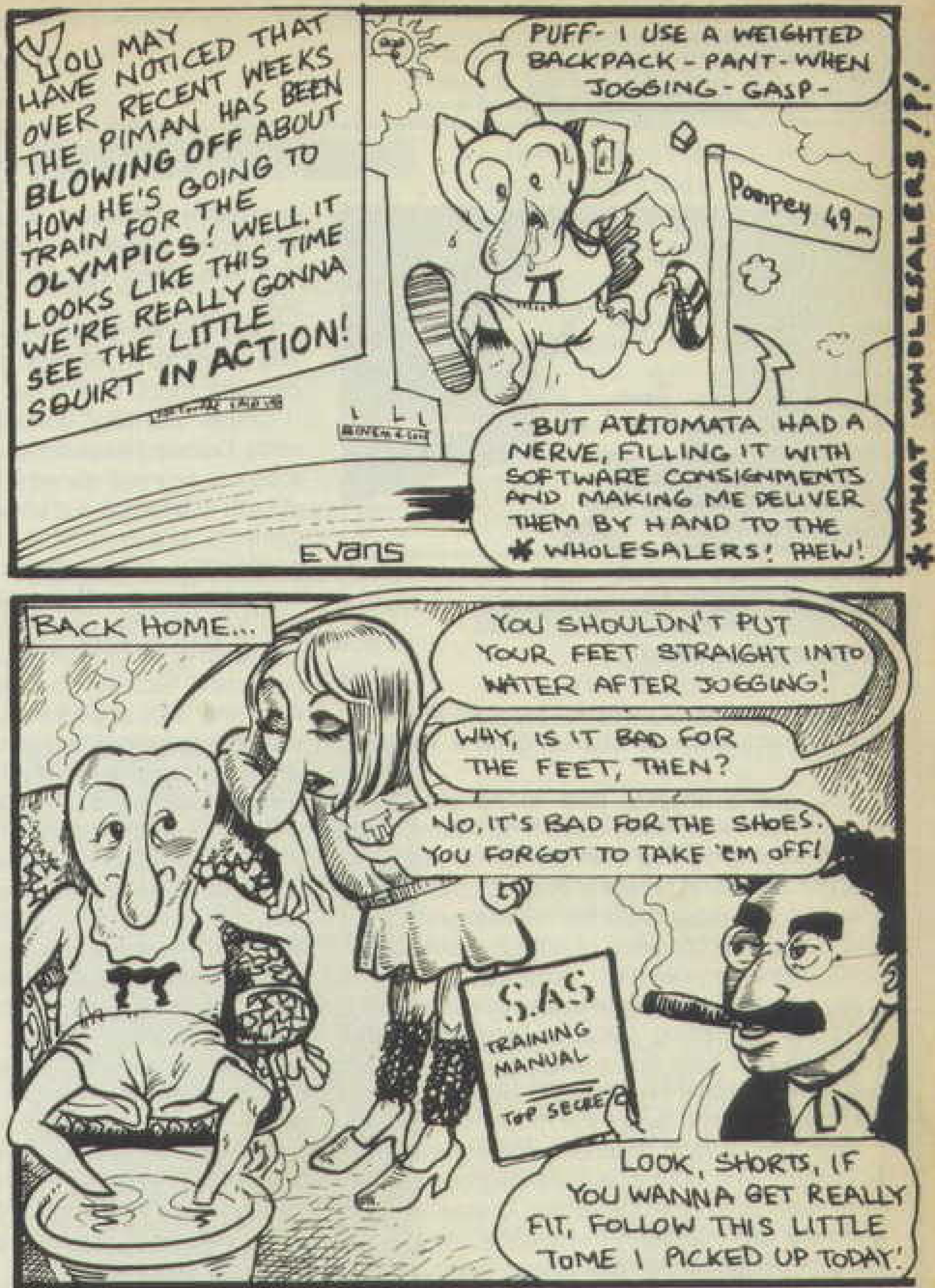
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10 LET A = 47 20 LET B = 1 30 LET C = SQR(A * A + B * B) 40 LET C = VAL STR$ C 50 IF C - INT C = 0 THEN GOTO 100 60 LET B = B + 1 70 GOTO 30 100 PRINT "B = ";B;" C = ";C 110 PRINT 120 LET X = ACS(A/C) 130 LET X = X * 180/PI 140 PRINT "BEARING FROM B = "; X ;" DEGREES" 150 STOP
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By running this program we find that the only possible right-angled triangle with unit sides of 47, 1104, and 1105 units will have an angle of B of approximately 87.56 degrees.

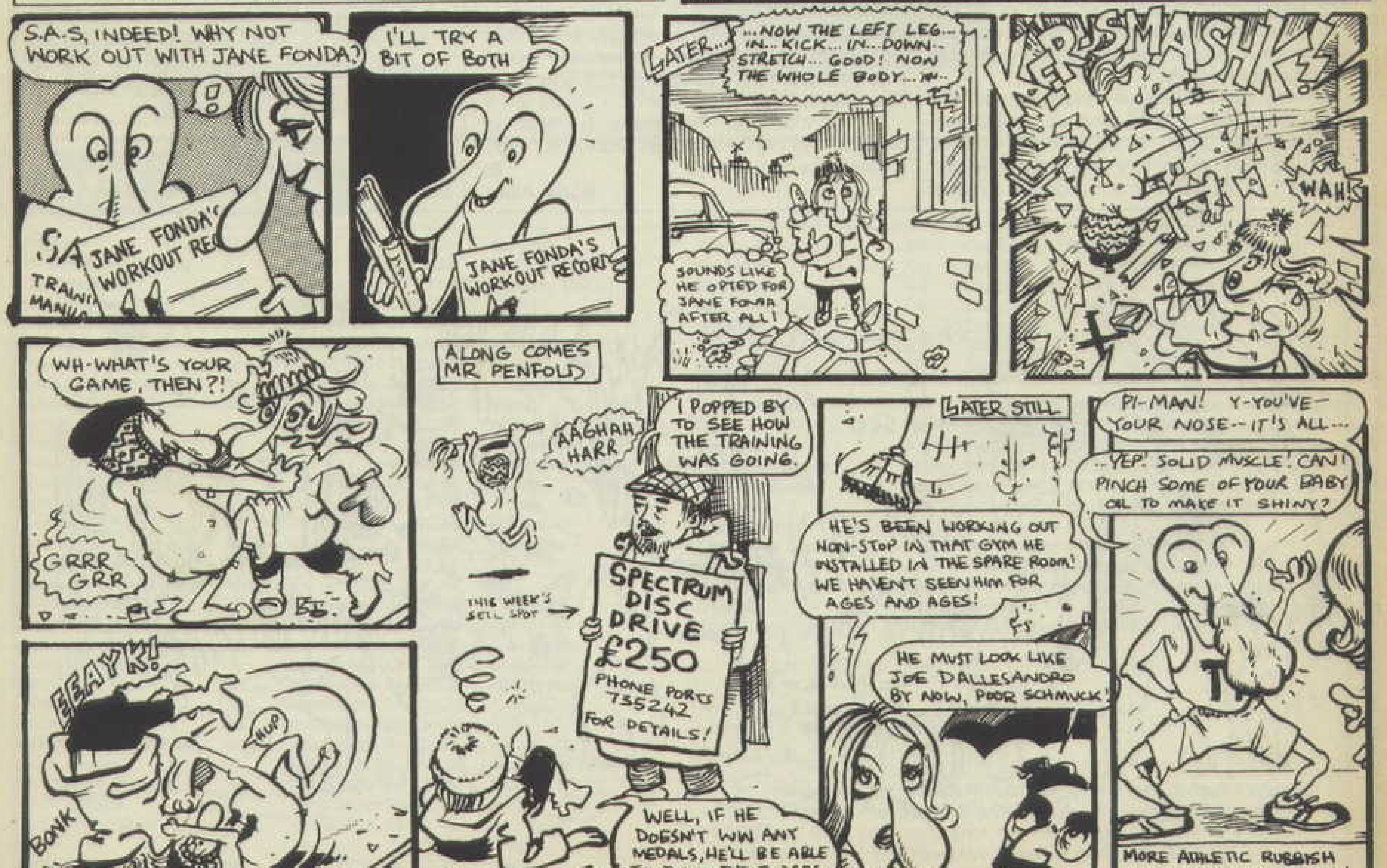
Winner of Puzzle No 90

The winner is: P J Warburton, Mayflower Drive, Marford, Wrexham, Clwyd, who receives £10.





YOU MAY HAVE NOTICED THAT OVER RECENT WEEKS THE PIMAN HAS BEEN BLOWING OFF ABOUT HOW HE'S GOING TO TRAIN FOR THE OLYMPICS! WELL, IT LOOKS LIKE THIS TIME WE'RE REALLY GONNA SEE THE LITTLE SQUIRT IN ACTION!
PUFF- I USE A WEIGHTED BACKPACK - PANT- WHEN JOGGING - GASP-
Pompey 49m
-BUT AUTOMATA HAD A NERVE, FILLING IT WITH SOFTWARE CONSIGNMENTS AND MAKING ME DELIVER THEM BY HAND TO THE * WHOLESALERS! PHEW!
* WHAT WHOLESALERS ?!?!
Evans
BACK HOME...
YOU SHOULDN'T PUT YOUR FEET STRAIGHT INTO WATER AFTER JOGGING!
WHY, IS IT BAD FOR THE FEET, THEN?
NO, IT'S BAD FOR THE SHOES. YOU FORGOT TO TAKE 'EM OFF!
S.A.S TRAINING MANUAL TOP SECRET
LOOK, SHORTS, IF YOU WANNA GET REALLY FIT, FOLLOW THIS LITTLE TOME I PICKED UP TODAY!



S.A.S, INDEED! WHY NOT WORK OUT WITH JANE FONDA?
JANE FONDA'S WORKOUT REC
I'LL TRY A BIT OF BOTH
JANE FONDA'S WORKOUT RECORD
LATER...
...NOW THE LEFT LEG... IN... KICK... IN... DOWN... STRETCH... GOOD! NOW THE WHOLE BODY... IN...
SOUNDS LIKE HE OPTED FOR JANE FONDA AFTER ALL!
KERSMASH!
WAH!
WH-WHAT'S YOUR GAME, THEN?!
GRRR GRR
EEAYK!
HUP
BONK
ALONG COMES MR PENFOLD
AAGHAH HARR
I POPPED BY TO SEE HOW THE TRAINING WAS GOING.
THIS WEEK'S SELL SPOT
SPECTRUM DISC DRIVE £250 PHONE PORTS 735242 FOR DETAILS!
WELL, IF HE DOESN'T WIN ANY MEDALS, HE'LL BE ABLE TO DO IN THE JUDGES.
LATER STILL
HE'S BEEN WORKING OUT NON-STOP IN THAT GYM HE INSTALLED IN THE SPARE ROOM! WE HAVEN'T SEEN HIM FOR AGES AND AGES!
HE MUST LOOK LIKE JOE DALLESANDRO BY NOW, POOR SCHMUCK!
PI-MAN! Y-YOU'VE- YOUR NOSE--IT'S ALL--
..YEP! SOLID MUSCLE! CAN I PINCH SOME OF YOUR BABY OIL TO MAKE IT SHINY?
MORE ATHLETIC RUBBISH NECK'S WEAK, FOLKS!